SOIL SURVEY OF DUNKLIN COUNTY MISSOURI

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
IN COOPERATION WITH THE
MISSOURI AGRICULTURAL EXPERIMENT STATION

How To Use This Soil Survey

General Soil Map

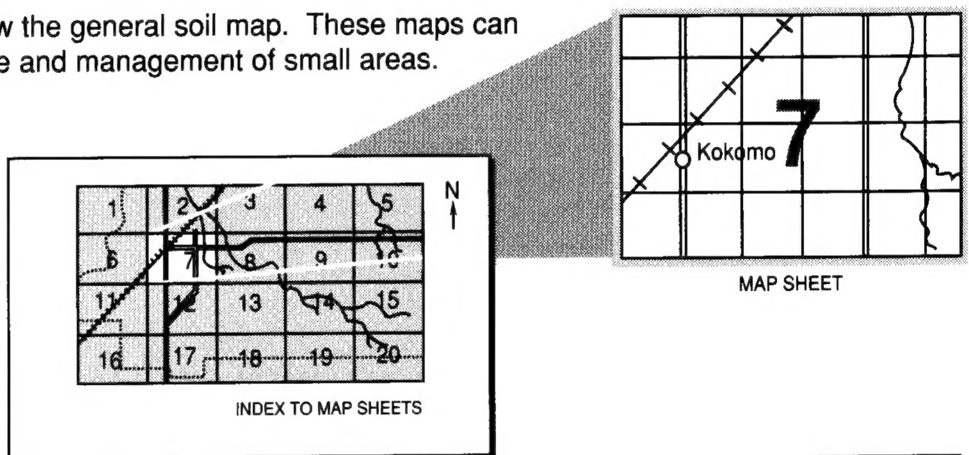
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

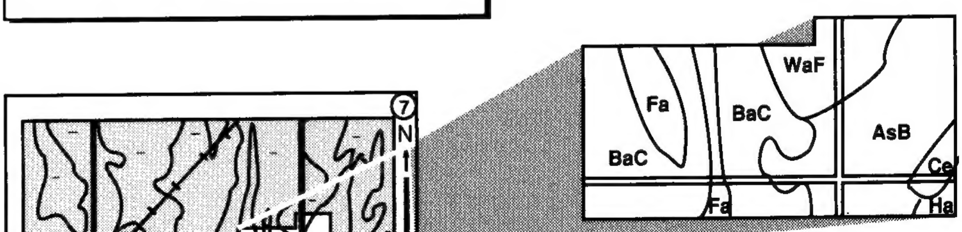
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

MAP SHEET

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET

AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1972-76. Soil names and descriptions were approved in 1976. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1976. This survey was made cooperatively by the Soil Conservation Service, the Missouri Agricultural Experiment Station, and the Dunklin County Soil and Water Conservation District. It is part of the technical assistance furnished to the Dunklin County Soil and Water Conservation District.

Soil maps in this survey may be copied without permission, but any enlargement of these maps can cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

Cover: Cotton growing on Dubbs silt loam. Dunklin is the major cotton producing county in Missouri.

Contents

Issued March 1979

Index to map units

Summary of tables

Foreword

The Soil Survey of Dunklin County, Missouri contains much information useful in any land-planning program. Of prime importance are the predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in the soil, improvements needed to overcome these limitations, and the impact that selected land uses will have on the environment.

The soil survey of Dunklin County, Missouri, was initiated at the request of local residents for their use. The Dunklin County Soil and Water Conservation District spearheaded a drive to raise funds to share the cost of the soil survey. This is the first cost-share soil survey completed in Missouri.

This soil survey has been prepared for many different users. Farmers, ranchers, foresters, and agronomists can use it to determine the potential of the soil and the management practices required for food and fiber production. Planners, community officials, engineers, developers, builders, and homebuyers can use it to plan land use, select sites for construction, develop soil resources, or identify any special practices that may be needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the soil survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map; the location of each kind of soil is shown on detailed soil maps. Each kind of soil in the survey area is described, and much information is given about each soil for specific uses. Additional information or assistance in using this publication can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

This soil survey can be useful in the conservation, development, and productive use of soil, water, and other resources.

Kenneth G. McManus

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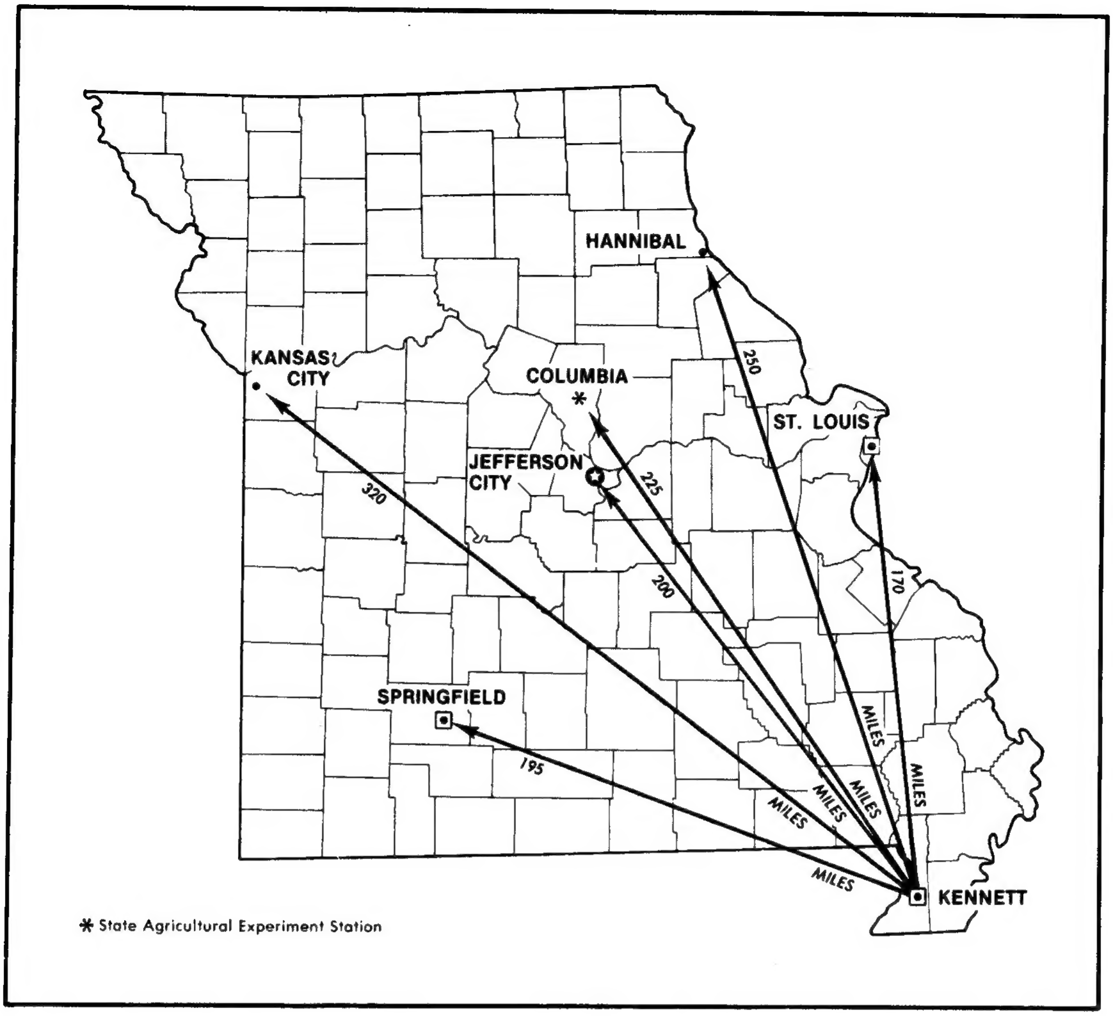

Location of Dunklin County in Missouri.

SOIL SURVEY OF DUNKLIN COUNTY, MISSOURI

By Phill D. Gurley, Soil Conservation Service

Fieldwork by Phill D. Gurley, Party Leader; Billy E. Sparkman and Kees W. Vandermeer, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with the
Missouri Agricultural Experiment Station and the Dunklin County Soil and Water Conservation District

DUNKLIN COUNTY is in the extreme southeastern corner of Missouri, and is part of an area known as the "Bootheel" because of its outline. Kennett, the county seat, has a population of 10,090.

The county is about 43 miles from north to south, and from east to west at its widest point it measures 23 miles and narrows to about 6 miles. It has a total area of 543 square miles, or 347,520 acres (*21*).

Dunklin County is part of the Southern Mississippi Valley Alluvium and Southern Mississippi Valley Silty Uplands land resource areas (*2*). About 96 percent of the county is in the Mississippi River delta; the remaining area, known as Crowleys Ridge, is in uplands. With the exception of Crowleys Ridge, the county is relatively flat with only gradual changes in elevation, though some ridges have short slopes with changes of as much as 10 feet. The delta part of the county has old channels, bayous, and natural levees formed by streams that have since disappeared from the flood plain. The uplands consist of sloping areas of wind-blown particles, or loess.

The St. Francis River, its tributaries, and distributaries drain most of the area west of Crowleys Ridge. Areas to the east and south of the ridge are drained by the Little River drainage system, Elk Chute, and by natural drains such as Kinnemore Slough, Honeycypress, Buffalo, and the Varney River. Many ditches and drainage districts have been established.

Elevation ranges from about 230 feet in the southern part of the county to 500 feet on Crowleys Ridge.

Agriculture is the main industry, with cash crops as the major source of farm income. Crops include soybeans, cotton, corn, wheat, grain sorghum, watermelons, and peaches.

General nature of the county

This section gives general information concerning the county. It describes history and development, natural resources, physiography, relief, drainage, farming, and climate.

History and development

Indians of various tribes were the inhabitants when the first settlers arrived in what later became Dunklin County. It is generally agreed that Hernando DeSoto and his party, exploring in the 1540's, were the first Europeans to enter the area (*14*). DeSoto visited an Indian village which historians suggest was situated on the lower end of a peninsula of high land extending through what is now Dunklin County and Mississippi County, Arkansas. Early records indicate that the county was heavily forested except for two large openings, one of which was in the vicinity of Caruth and was named the Grand Prairie, and the other, near Malden, was known as West Prairie.

The first settlers moved to the future site of Malden in 1829, Hornersville was established in 1840, and 5 years later Dunklin County was organized. Malden became a town later and was said to be the largest in the county.

Dunklin County was organized from part of Stoddard County and named in honor of Daniel Dunklin, who was governor of Missouri from 1832 to 1836 (*14*). In 1853 the county was enlarged by a strip 9 miles wide on the north. Much of the southern part belonged to Arkansas until leading citizens exerted influence to have the boundary changed to the 36th parallel.

In 1846 the county seat was established and named Chilletecaux, the name of the chief of a nearby village of Delaware Indians. Later the town name was changed to Butler and after a few years to Kennett, the present name.

Early residents used waterways for much of their transportation. Travel across the wet areas of the gumbo flats was difficult and thus restricted trade with areas to the east and along the Mississippi River. The early roads usually followed ridges of high ground, which provided a more durable and useful passageway. From Clarkton

east to points across the so-called swamp, there was a "pole road" paved with logs.

Water from uplands as far away as 100 miles once flowed through the gumbo flats and along the recent deposits, but as levees were built the upland water was diverted. Some emptied into the Mississippi River, and some was contained in a narrow area along the St. Francis River, making the formerly wet and low-lying areas of the county more valuable. Much of the old swamp was drained in 1914 when the main channel of the Little River drainage system was constructed (*17*).

Following drainage, the timber was more easily harvested, and the cleared land made farming more practical. Railroads were built to carry the timber and other crops from the county. Soon railroads reached their peak in miles of tracks, but today they are steadily decreasing in length and number.

Transportation is presently provided by railroad systems, U. S. Highway 62, and State and county roads. There are only two places in the county where roads cross the Little River drainage system, but there are four places where highways cross the St. Francis River, the western boundary of the county.

Natural resources

Soil and its associated crops are the most important natural resources of Dunklin County. Many products are derived, either directly or indirectly, from the soil: crops, livestock, wood, fruits, vegetables, honey, and fibers are all produced on farms and are marketable items. In addition, the county uses its own soil materials such as topsoil, sand, and gravel.

One of the abundant but relatively undeveloped resources of the county is its water supply, which is adequate for domestic use and watering of livestock. Most local water is supplied by three main aquifers or water-bearing strata: (1) alluvial sand and gravels, (2) sands of the Wilcox formation, and (3) McNairy (Ripley) sands (*19*). Water from the upper layers of the alluvium usually has more iron than that from underlying geological strata.

Local organized water districts furnish water to most of the county. Shallow and easily-constructed wells are driven into the alluvium at depths from 15 to 50 feet to supply most private and domestic water. The uplands are favorable for pond development, and water stored in these areas is used for livestock watering and for spraying orchards (fig. 1).

Irrigation wells produce from 600 to more than 3,000 gallons per minute and are distributed throughout the county. Output is determined by the size of the well or pump. Wells generally are of the 12-inch size, but some are as small as 6 inches or as large as 16 inches. Most are about 80 to 120 feet deep. Areas west of Crowleys Ridge generally require turbine pumps to maximize output; however, areas south and east of the ridge normally have sufficient volume with the use of centrifugal pumps.

Analysis of irrigation water reveals the pH to be about 7.0 to 8.0, and in most cases the water is high in calcium and magnesium carbonates.

The Wilcox sands are also important water-supplying formations. The water is generally higher in iron, and wells situated in this formation seldom flow above ground (*19*).

The McNairy (Ripley) sands supply much of the water for industry and municipalities (*20*). Most wells situated in this formation flow at ground level, and the water is soft, and is low in iron content (*19*).

Physiography, relief, and drainage

Most of Dunklin County is a nearly level part of the Mississippi River delta, though a small part consists of gently sloping to moderately steep uplands. The delta section at one time functioned as a flood plain for the Mississippi-Ohio River complex (*13*), and major physiographic features of the county were determined by changes in the flow and load of these rivers. The one exception is the static uplands of Crowleys Ridge, where the rivers flowed on both sides.

Dunklin County has six major physiographic areas (fig. 2). These are: (1) recent deposits, (2) silty terraces, (3) loess uplands, (4) mixed alluvium, (5) natural levees, and (6) gumbo flats.

The recent deposits are along the St. Francis River and its flood plain, and along the edge of Crowleys Ridge where deposits are still being made. This physiographic area is nearly level and consists of alluvium high in silt. Wetness is the major concern, and overflow is a hazard along the St. Francis River.

The silty terraces lie between the recent deposits and the loess uplands, with a small area to the south and adjacent to the uplands. This area is nearly level except along the edge of the ridges. It is alluvial in origin, and the soils are high in silt and are generally acid; some are high in sodium. Soils of this area are loamy or clayey, and slow permeability and slow runoff make wetness the main management concern.

The loess uplands are the gently sloping to moderately steep areas of Crowleys Ridge. These are the oldest landforms and the highest elevations of the county. Sand and gravel have been excavated for local use from underlying deposits in this area. Soils are loamy, and erosion is the main management concern (fig. 3). The major peach producing sites are in this physiographic area.

The mixed alluvium consists of nearly level areas of loamy alluvium. These areas drain some of the higher sandy and loamy ridges. The areas, in most instances, are on low ridges. Wetness is the major management concern.

The natural levees are landforms of sandy and loamy soils on high alluvial ridges that border the former chan-

nels of the Mississippi River, its tributaries, and its distributaries. These areas were some of the first of the county to be settled and are where most of the county's cotton and watermelons are produced.

The gumbo flats are level or nearly level areas of clayey alluvium. The area is a typical backswamp, and soils that formed here shrink and crack when dry, but swell back together when wet. Because of the slow permeability and local ponding, the main management factor is wetness.

Large rivers, such as the Mississippi, have flooded parts of the county in the past; however, overflow was controlled with the construction of levees on the Mississippi and St. Francis Rivers. Thus, most of the county is now protected from river overflow, though many areas have saturated soils during rainy seasons because of the restricted soil permeability and level topography.

Farming

Early settlers usually came from nearby states and settled on higher ridges of the county, leaving the lower and wetter areas to be developed later. Thus, some of the higher parts of the Grand Prairie, West Prairie, and Crowleys Ridge have been farmed for more than 125 years. In contrast, some of the wetter and lower lying parts have been cultivated for only a few years. A small part is still in woodland.

At the time the ridges were settled, only a small acreage was necessary to sustain a family, so the farms on the ridges were and still are smaller, on the whole, than those developed later.

The early settlers grew crops mainly for consumption by themselves or their livestock. Their diet was supplemented by local wildlife, such as buffalo, deer, turkey, and racoon, as well as by local fruits, nuts, and berries. As logging and clearing continued, however, more and more areas were farmed.

At present about 90 percent of the county is used for crops (*18*). Soybeans make up the major acreage, with about 220,000 acres grown annually. Wheat and cotton are grown on about 80,000 acres each. Dunklin County is the major cotton-producing county in the state. Soybeans are well suited and are commonly used in a double cropping system. They are planted after wheat is harvested. The remaining acreage is used for corn, grain sorghum, purple-hull peas, watermelons, cantaloupes, peaches, woodland, and peanuts.

The amount of livestock decreased with the coming of machinery and as row crops became the major enterprise. Cotton gins, compresses, seed oil mills, grain elevators and dryers, farm machinery dealerships, fertilizer plants, peach packing plants, farm produce transportation, crop dusting, apiaries, and numerous other agriculturally related businesses now operate in the county (fig. 4).

Industries not closely related to farming are also increasing. These include numerous smaller businesses as well as factories for making garments, electrical motors, rubber products, and pistons.

Climate

Dunklin County has long, hot summers and rather cool winters. Cold waves bring lower and occasionally subfreezing temperatures but seldom much snow. Precipitation is fairly heavy throughout the year with a slight peak in winter, and prolonged droughts are rare. Summer precipitation falls mainly in afternoon thunderstorms, and is usually adequate for all crops when distribution is favorable.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Kennett, Missouri, for the period 1953 to 1974. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 40 degrees F., and the average daily minimum is 30 degrees. The lowest temperature on record, -7 degrees, occurred at Kennett on January 24, 1963. In summer the average temperature is 79 degrees, and the average daily maximum is 91 degrees. The highest temperature, 108 degrees, was recorded on July 18, 1954.

Growing degree days, shown in table 1, are equivalent to "heat units." Beginning in spring, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F.). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

An important peach growing industry has been established on the upland part of the county. Here, the positions of certain soils provide air drainage that allows colder damp air to settle at lower elevations. However, at times the cold air settles in the lower positions on the landscape and threatens reduction or near failure of crops.

Of the total annual precipitation, 26 inches, or 53 percent, usually falls during the period of April through September, which includes the growing season for most crops. Two years in ten, the April-September rainfall is less than 19 inches. The heaviest one-day rainfall during the period of record was 9.66 inches, at Kennett on August 14, 1957. Thunderstorms number about 53 each year, 21 of which occur in summer.

However, precipitation is not always a dependable measure of moisture available to plants. Runoff and evaporation cause moisture loss, reducing amounts available to plants. Much of the precipitation that falls in summer thunderstorms is lost in this manner. Soils with slow infiltration rates or with slope lose more precipitation by runoff than other soils.

When showers are light and widely spaced in time, evaporation increases and there is a local moisture deficit. At such times supplemental irrigation would benefit crops on some soils.

Sandy soils or those with low available water capacity are droughty for brief periods during most years. The available water capacity of soils of Dunklin County ranges from low to very high.

Average seasonal snowfall is 8 inches. The greatest snow depth at any one time during the period of record was 7 inches. On the average, 2 days each season have at least 1 inch of snow on the ground, but the number of days varies greatly from year to year.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night in all seasons, and the average at dawn is about 80 percent. The percentage of possible sunshine is 75 percent in summer and 50 percent in winter. The prevailing direction of the wind is from the south. Average windspeed is highest, 11 miles per hour, in March.

Severe local storms, including tornadoes, may strike in or near the county occasionally but are of short duration, and damage is variable and spotty.

How this survey was made

Soil scientists made this survey to learn what kinds of soil are in the survey area, where they are, and how they can be used. The soil scientists went into the area knowing they likely would locate many soils they already knew something about and perhaps identify some they had never seen before. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material, which has been changed very little by leaching or by the action of plant roots.

The soil scientists recorded the characteristics of the profiles they studied, and they compared those profiles with others in counties nearby and in places more distant. Thus, through correlation, they classified and named the soils according to nationwide, uniform procedures.

After a guide for classifying and naming the soils was worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, roads, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called soil map units. Some map units are made up of one kind of soil, others are made up of two or more kinds of soil, and a few have little or no soil material at all. Map units are discussed in the sections "General soil map for broad land-use planning" and "Soil maps for detailed planning."

While a soil survey is in progress, samples of soils are taken as needed for laboratory measurements and for engineering tests. The soils are field tested, and interpretations of their behavior are modified as necessary during the course of the survey. New interpretations are added to meet local needs, mainly through field observations of different kinds of soil in different uses under different levels of management. Also, data are assembled from other sources, such as test results, records, field experience, and information available from state and local specialists. For example, data on crop yields under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it is readily available to different groups of users, among them farmers, managers of rangeland and woodland, engineers, planners, developers and builders, homebuyers, and those seeking recreation.

General soil map for broad land-use planning

The general soil map at the back of this publication shows, in color, map units that have a distinct pattern of soils and of relief and drainage. Each map unit is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map provides a broad perspective of the soils and landscapes in the survey area. It provides a basis for comparing the potential of large areas for general kinds of land use. Areas that are, for the most part, suited to certain kinds of farming or to other land uses can be identified on the map. Likewise, areas of soils having properties that are distinctly unfavorable for certain land uses can be located.

Because of its small scale, the map does not show the kind of soil at a specific site. Thus, it is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The kinds of soil in any one map unit differ from place to place in slope, depth, drainage, or other characteristics that affect their management.

Since most of the land area in Dunklin County is cultivated cropland, the selection, use, and management of soil for crops is important. As a general rule, soils that have the fewest limitations for cropland are also the soils

with the fewest limitations for nonfarm uses. Each year a few more acres are taken out of woodland or other uses and converted to cropland. It is estimated that about 90 to 95 percent of the county is now used as cropland.

The general soil map is helpful in selecting large areas of soils that have the same potentials or limitations. The Malden-Canalou-Bosket association and the Dubbs association generally have the best potential and the fewest limitations. These soils have good drainage and are situated in landscape positions that generally are not affected by wetness. The sandier parts of these associations have potential for special crops. The Loring-Memphis-Falaya association has few limitations where the slope is less than about 5 percent. Erosion control is a management concern on these soils.

The remaining soil associations (the Falaya-Fountain, Crowley-Calhoun-Foley, Gideon-Lilbourn, Sharkey, and Dundee-Silverdale) have good potential for farming but generally have only fair to poor potential for nonfarm uses. In these associations, the dominant soils are Crowley, Falaya, Gideon, Sharkey, and Dundee. Wetness is the major limitation to nonfarm uses, but many areas have sufficient drainage for farm crops.

Deciding which land should be used for urban development is becoming more important in the survey area. Each year a few more acres are developed for residential and commercial use. Major areas of development are generally associated with towns such as Kennett, Senath, Cardwell, Arbyrd, Holcomb, Malden, and Campbell. It is estimated that about 21,000 acres of the county are built up or urban (*21*). The General Soil Map is helpful for planning the future expansion of such built-up areas, but generally the soils that have good potential for such use are also those with good potential for cultivated crops.

Loring-Memphis-Falaya, Malden-Canalou-Bosket, and Dubbs soil associations are the most favorable places for urban development, and most of the towns in the county are situated on these three soil associations. The slope of the Loring-Memphis-Falaya association presents some difficulty in construction and waste disposal. However, these concerns can usually be overcome with proper design and installation of footings and waste disposal systems. Local short term flooding in the drainageways should be considered when locating houses and streets.

Some upland areas in the Loring-Memphis-Falaya association have gravel below a depth of about 6 feet. The Malden-Canalou-Bosket and the Dubbs associations are less sloping, but deep excavations might expose a water table during wet periods. Cutbanks in Malden soils are weak and should be shored if excavation is deep.

The other associations generally are too wet for good urban development. The Falaya-Fountain soil association receives overflow from higher positions, much of which occurs along the St. Francis River where flooding is a hazard.

Soils of the Crowley-Calhoun-Foley association are wet and have slow and very slow permeability. Soils of the Gideon-Lilbourn association are also wet and accumulate runoff from higher positions. The Dundee-Silverdale soil association has wetness limitations. The Sharkey association has clayey soils that have poor potential for urban development because of high shrink-swell potential and wetness.

Crops such as watermelons, cantaloupes, purple-hull peas, strawberries, peanuts, and other specialty crops are particularly well suited to soils of the Malden-Canalou-Bosket association. These soils have good internal and surface drainage, and this association and the Dubbs association have good potential for any crop requiring good drainage.

The Loring-Memphis-Falaya soil association has good potential and is being used for orchard crops such as peaches, apples, nectarines, and pears. Nurseries are well suited to these soils.

The Sharkey association has the best potential in the county for rice or catfish farming. These clayey soils hold water with little loss from seepage.

The Crowley-Calhoun-Foley and Gideon-Lilbourn associations also have good potential for rice. Most of the soils of the county that are planted to wheat are double cropped with soybeans, peas, or grain sorghum following the wheat.

Most soils of the county have good potential for woodland, but there are not many large tracts. The area along the St. Francis River in the Falaya-Fountain soil association and parts of the Sharkey association near Hornersville are the main locations of woodland. Most of the soils in woodland have some wetness, and the rate of tree growth is often determined by the degree of wetness. Several areas scattered throughout the county have been planted to pecans.

The Loring-Memphis-Falaya soil association has good potential as park sites and extensive recreation areas. Hardwood forests enhance the esthetic value of part of this association, and orchard trees in bloom offer pleasing scenery. The timbered parts which are mainly in the Falaya-Fountain and Sharkey associations provide nature study areas. Most of the remainder of the county is cleared, except for scattered areas, and few natural spots are still intact.

1. Falaya-Fountain association

Deep, nearly level, somewhat poorly drained and poorly drained silty soils on flood plains, levees, and low terraces

Areas of these nearly level soils are adjacent to the St. Francis River (fig. 5) and in narrow bands along the side of Crowleys Ridge.

This soil association makes up about 4 percent of the county. About 70 percent of the association is Falaya

soils, 20 percent is Fountain soils, and the remaining 10 percent is soils of minor extent.

Falaya soils are on recent flood plains and are slightly lower in elevation than the Fountain soils. They are somewhat poorly drained and have a seasonal high water table. These soils have a surface layer of silt loam.

The Fountain soils are at a slightly higher elevation than the Falaya soils. They are poorly drained and have a seasonal high water table. Fountain soils have a surface layer of silt loam and more clay in the subsoil than Falaya soils. Fountain soils are nonacid.

Soils of minor extent are the poorly drained Gideon and Wardell soils; the somewhat poorly drained Crowley, Dundee, and Lilbourn soils; the moderately well drained Canalou, Collins, and Farrenburg soils; and the well drained Dubbs soils. Canalou, Collins, Crowley, Dubbs, Dundee, and Farrenburg soils are on ridges; and Gideon, Lilbourn, and Wardell soils are in drainageways.

The soils in this association are used mostly for cultivated crops where they are protected by the St. Francis River levee. Though most of the acreage has been drained, wetness is the main limitation for farming and for most other uses. Flooding occurs inside the St. Francis River levee. Most of the acreage between the St. Francis River and its levee is still in woodland.

These soils have good potential for cultivated crops and woodland when adequate drainage is provided. Because of wetness, runoff from higher areas, and a seasonal high water table, the soils of this association have poor potential for residential and urban uses and fair to poor potential for recreational uses. The potential for wildlife habitat is good but only fair where drainage is needed. Surface drainage by a system of ditches generally removes excess water except in areas in the immediate flood plain of the St. Francis River.

2. Crowley-Calhoun-Foley association

Deep, nearly level, somewhat poorly drained and poorly drained silty soils on terraces and levees

The major acreage in this association is west of Crowleys Ridge, but a small area is south of and adjacent to Crowleys Ridge. These areas are abandoned flood plains and terraces and are older than most of the alluvium in the county (fig. 6).

This association makes up about 10 percent of the county. About 46 percent of the association is Crowley soils, 17 percent Calhoun soils, and about 6 percent Foley soils. The remaining 31 percent is soils of minor extent.

Crowley soils, in most places, are lower in elevation than the Calhoun or Foley soils. Crowley soils have a silt loam surface layer and clayey subsoil. They are somewhat poorly drained and have a high or perched water table during wet periods.

Calhoun soils have a silt loam surface layer and a loamy (silty) subsoil. They are poorly drained and have a high or perched water table during wet periods.

Foley soils have a silt loam surface layer and a loamy (silty) subsoil. These soils have layers with high sodium content. Foley soils are poorly drained and have a high or perched water table during wet periods.

Soils of minor extent are the well drained Dubbs, the somewhat poorly drained Falaya and Dundee, and the poorly drained Baldwin and Jackport soils. Dubbs soils are on high ridges, and Dundee soils are on low ridges. Falaya soils are along drainageways, and Baldwin and Jackport soils are in low depressions.

The soils in this association are used mainly for cropland, but some soils are used for pasture and woodland (fig. 7). Wetness is the main limitation to use of these soils, and most of the area is drained by a system of ditches. Ponding of runoff water occurs in local areas.

These soils have good potential for cultivated crops, and moderate potential for woodland where drained. Excess surface water generally can be removed by field ditches. Wetness is such a severe limitation and so difficult to overcome that the potential for residential and other urban uses is poor.

3. Loring-Memphis-Falaya association

Deep, gently sloping to moderately steep, moderately well drained and well drained silty soils on uplands, and deep, nearly level, somewhat poorly drained silty soils on flood plains

This association occupies Crowleys Ridge, the upland part of the county (fig. 8). It is the highest elevation and landform in the county and consists of soils formed in wind deposited sediment.

This soil association makes up about 4 percent of the county. About 36 percent of the association is Loring soils, 29 percent is Memphis soils, and 14 percent is Falaya soils. The remaining 21 percent is soils of minor extent and gravel pits.

Loring soils, in most places, are at slightly lower elevations or are less sloping than Memphis soils. Loring soils have a silt loam surface layer, are moderately deep and moderately well drained, and have a weak fragipan with a perched water table above it.

Memphis soils have a silt loam surface layer and are well drained.

Falaya soils have a silt loam surface layer. They are somewhat poorly drained and have a high water table during wet periods.

Soils of minor extent in this association are the moderately well drained Collins and the somewhat excessively drained Beulah soils. Collins soils are along the narrow draws and drainageways, and Beulah soils are on the long, gently sloping toe slopes of the east side of Crowleys Ridge.

The soils in this association are used for orchards, cultivated crops, pasture, and woodland. Slope and the hazard of erosion are the main management concerns of the soils in the upland part of this association. The Falaya soils have a wetness hazard.

These soils have good potential for cultivated crops, except in sloping areas, and also have good potential for woodland. For residential and other urban uses, the upland soils have poor potential on moderately steep areas and fair to good potential in gently sloping to strongly sloping areas. The drainageways have poor potential because of wetness and temporary flooding, though excess surface water can generally be removed by ditches.

4. Gideon-Lilbourn association

Deep, nearly level, poorly drained and somewhat poorly drained loamy soils in drainageways, basins, and on low natural levees

Areas of these soils are mainly in drainageways which provide part of the natural drainage for the adjacent sandy and loamy natural levees (fig. 9).

This soil association makes up about 10 percent of the county. About 40 percent of it is Gideon soils, about 25 percent is Lilbourn soils, and the remaining 35 percent is made up of soils of minor extent.

Gideon soils generally are at slightly lower elevations than the Lilbourn soils. Gideon soils have a loam surface layer and a seasonal high water table. They are poorly drained.

Lilbourn soils have a loam surface layer and a seasonal high water table. They are somewhat poorly drained.

Soils of minor extent in this association are the poorly drained Cairo, Roellen, and Sharkey soils, along with the moderately well drained Canalou and Farrenburg soils. Cairo, Roellen, and Sharkey soils are in the clayey drainageways. Canalou and Farrenburg soils are on higher elevations of natural levees.

The soils in this association are used mainly for cultivated crops, but a few areas are used for pasture and woodland. Wetness is the main limitation for farming and most other purposes. Most of the soils are drained by a system of ditches. Ponding of local runoff is a condition that also affects the use and management of soils in the association.

Where drained, these soils have good potential for cultivated crops and woodland. However, wetness so limits this association that it has poor potential for residential and other urban uses. Excess surface water can normally be removed by a system of ditches. These soils have fair potential for recreational uses except in wet areas. The potential for development of wetland habitat and water-holding impoundments is good, but some areas are seepy.

5. Malden-Canalou-Bosket association

Deep, nearly level or gently undulating, moderately well drained to excessively drained sandy and loamy soils on broad natural levees

Areas of this soil association follow a general orientation of southwest to northeast through the county. These areas are the natural levees of streams (fig. 10) that once flowed through the area. The levees are drained by a system of low channels and depressions. This association is at higher positions on the landscape than the adjacent areas of the Gideon-Lilbourn and Sharkey associations.

This soil association makes up about 27 percent of the county. About 24 percent is Malden soils, 16 percent is Canalou soils, and 13 percent is Bosket soils. The remaining 47 percent is soils of minor extent.

Malden soils are nearly level or gently undulating and generally are on the highest elevations of the association. These soils are excessively drained and have a sandy surface layer. Areas of Malden soils are subject to wind erosion.

Canalou soils are moderately well drained and have a sandy surface layer and a fluctuating water table. Some areas are subject to wind erosion.

Bosket soils are well drained and have a loamy surface layer. Large unprotected areas are subject to wind erosion.

Soils of minor extent are the well drained and somewhat excessively drained Broseley soils; the moderately well drained Farrenburg soils; the somewhat poorly drained Dundee and Lilbourn soils; and the poorly drained Cairo, Gideon, Roellen, and Sikeston soils. Broseley and Farrenburg soils are on ridges or natural levees. Dundee and Lilbourn soils are in low natural drainageways. Cairo, Gideon, Roellen, and Sikeston soils are in drainageways.

The soils in this association are used almost exclusively for cultivated crops. Most of the watermelons and cantaloupes of the county are produced here (fig. 11).

These soils have good potential for cultivated crops and special crops, and for most residential and other urban uses. The areas with high water tables, however, have poor potential for residential and other urban uses.

6. Dubbs association

Deep, nearly level, well drained silty soils on broad natural levees or terraces

Most of the area of this association is bordered by the Little River drainage system on the east. The landscape is typified by flat-topped ridges that rise above concave drainageways (fig. 12). The area is generally higher than the adjacent soils of the Sharkey association and the Dundee-Silverdale association.

The Dubbs association makes up about 15 percent of the county. About 55 percent is Dubbs soils, and the

remaining 45 percent is made up of several soils of minor extent.

Dubbs soils are on the flat-topped, generally broad natural levees. Some areas are small. These soils have a silt loam surface layer.

Some of the soils of minor extent in this association are the poorly drained Cairo, Gideon, Roellen, and Sikeston soils; the somewhat poorly drained Dundee soils; and the moderately well drained Silverdale soils. Cairo, Gideon, Roellen, and Sikeston soils are in the low natural drainageways. Dundee soils are in drainageways and on ridges high on the landscape. Silverdale soils are in sandy areas in close association with Dubbs and Dundee soils.

These soils are mainly used for cultivated crops, but a few areas are used for pasture. Some strawberries are grown.

These soils have good potential for cultivated crops and special crops. They have fair potential for most residential and other urban uses.

7. Sharkey association

Deep, level and nearly level, poorly drained clayey soils in slack water positions

These level and nearly level soils are in old slack water areas that held water much of the time before modern drainage (fig. 13). They are lower than the surrounding land of the Malden-Canalou-Bosket association and the Dubbs association.

The Sharkey association makes up about 21 percent of the county. About 75 percent is Sharkey soils, and the remaining 25 percent is soils of minor extent.

Sharkey soils are generally in nearly level or slightly concave areas, and they generally have a silty clay loam surface layer but in places have a clay surface layer. In all areas the surface layer shrinks and swells with drying and wetting and is sticky and plastic when wet.

Some of the soils of minor extent are the moderately well drained Steele soils and the poorly drained Alligator and Gideon soils. Steele soils are on low, slightly convex sandy ridges. Alligator and Gideon soils are in positions similar to Sharkey soils but are generally a little higher in elevation.

These soils are mainly used for cultivated crops. A few areas are wooded. Ponding is common, mainly in winter and spring. Most areas have been drained by a system of ditches, and some areas have been graded to enhance local drainage. The major limitations of these soils for agricultural and other uses are wetness and shrink-swell potential.

8. Dundee-Silverdale association

Deep, nearly level, somewhat poorly drained and moderately well drained sandy and loamy soils on low natural levees

The area is typified by flat to slightly convex ridges of Dundee soils, with concave basins and drainageways of Silverdale soils (fig. 14). The area is slightly lower than the surrounding land of the Dubbs association.

This association makes up about 9 percent of the county. About 55 percent of the association is Dundee soils, 30 percent Silverdale soils, and about 15 percent soils of minor extent.

Dundee soils generally are slightly higher on the landscape than the Silverdale soils and are somewhat poorly drained. They have a loamy sand surface layer and a seasonal high water table.

Silverdale soils are moderately well drained. They have a loamy sand surface layer and a seasonal high water table.

Soils of minor extent are the poorly drained Cairo, Gideon, Roellen, and Sikeston soils. They are all in the lower lying natural drainageways.

The soils in this association are used mainly for cultivated crops, but a few areas are used for pasture or woodland. On the lower lying Silverdale soils, local runoff ponds for short periods, mainly in winter and spring. Wetness is the main limitation for farming and most other uses. In addition, wind erosion occurs where the soil is not protected.

These soils have good potential for cultivated crops. Because of wetness, they have poor potential for residential and urban uses. Excess surface water can generally be removed by field ditches.

Soil maps for detailed planning

The map units shown on the detailed soil maps at the back of this publication represent the kinds of soil in the survey area. They are described in this section. The descriptions together with the soil maps can be useful in determining the potential of a soil and in managing it for food and fiber production; in planning land use and developing soil resources; and in enhancing, protecting, and preserving the environment. More information for each map unit, or soil, is given in the section "Use and management of the soils."

Preceding the name of each map unit is the symbol that identifies the soil on the detailed soil maps. Each soil description includes general facts about the soil and a brief description of the soil profile. In each description, the principal hazards and limitations are indicated, and the management concerns and practices needed are discussed.

The map units on the detailed soil maps represent an area on the landscape made up mostly of the soil or soils for which the unit is named. Most of the delineations shown on the detailed soil map are phases of soil series.

Soils that have profiles that are almost alike make up a *soil series*. Except for allowable differences in texture

of the surface layer or of the underlying substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement in the profile. A soil series commonly is named for a town or geographic feature near the place where a soil of that series was first observed and mapped. The Malden series, for example, was named for the town of Malden in Dunklin County.

Soils of one series can differ in texture of the surface layer or in the underlying substratum and in slope, erosion, stoniness, salinity, wetness, or other characteristics that affect their use. On the basis of such differences, a soil series is divided into phases. The name of a *soil phase* commonly indicates a feature that affects use or management. For example, Memphis silt loam, 5 to 9 percent slopes, is one of several phases within the Memphis series.

Some map units are made up of two or more dominant kinds of soil. Such map units are called soil complexes.

A *soil complex* consists of areas of two or more soils that are so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area includes some of each of the two or more dominant soils, and the pattern and proportion are somewhat similar in all areas. Alligator-Steele complex is an example of a soil complex in Dunklin County.

Most map units include small, scattered areas of soils other than those that appear in the name of the map unit. Some of these soils have properties that differ substantially from those of the dominant soil or soils and thus could significantly affect use and management of the map unit. These soils are described in the description of each map unit. Some of the more unusual or strongly contrasting soils that are included are identified by a special symbol on the soil map.

Most mapped areas include places that have little or no soil material and support little or no vegetation. Such places are called *miscellaneous areas*; they are delineated on the soil map and given descriptive names. Pits, gravel, is an example. Some of these areas are too small to be delineated and are identified by a special symbol on the soil map.

The acreage and proportionate extent of each map unit are given in table 4, and additional information on properties, limitations, capabilities, and potentials for many soil uses is given for each kind of soil in other tables in this survey. (See "Summary of tables.") Many of the terms used in describing soils are defined in the Glossary.

Ag—Alligator silty clay loam. This level to nearly level, poorly drained soil is on low convex ridges and in broad depressions. These slack water positions are known locally as "gumbo" or "yellow-gumbo" ridges. Areas are generally long and narrow and range from 20 to 200 acres or more.

Typically, the surface layer is very dark gray silty clay loam about 7 inches thick. The subsoil is about 42 inches thick and is dark gray, gray, and light brownish gray, firm clay that has common yellowish brown mottles and a few concretions. The underlying material is gray and dark gray clay to a depth of 60 inches or more. In places the surface layer is silty clay or clay.

Included with this soil in mapping are small areas of Sharkey and Steele soils. Sharkey soils have less acid reaction. Steele soils are moderately well drained and contain sandy upper layers. Sharkey soils are in drainageways and depressions, while Steele soils are on low ridges. Inclusions make up about 10 percent of the unit.

The Alligator soil has very slow permeability and surface runoff. It shrinks and cracks when dry but swells when wet. Available water capacity is moderate. A water table often perches at about 18 inches during and following periods of heavy rainfall.

The subsoil is strongly acid or very strongly acid, but the surface layer is strongly acid to slightly acid as a result of liming or addition of irrigation water. The inherent fertility is medium, and organic matter content is low. The poor tilth of the surface soil makes it difficult to till or prepare a suitable seedbed.

This soil has good potential for rice, selected pasture and hay crops, and trees. It also has good potential for development of water-holding structures but poor potential for most other engineering uses.

Most areas are cultivated. The major crops are soybeans, cotton, and wheat. If adequately drained, this soil is suited to most crops common to the county. The soil holds large amounts of water, but only a moderate amount is available to plants. Potholes and sloughs remain wet for longer periods than other areas of this soil. Excess surface water can generally be removed by surface ditches or landforming, which helps eliminate potholes and provides a suitable grade for irrigation.

Residue management that provides a protective cover maintains or improves soil tilth and surface infiltration. Tillage can be accomplished far enough in advance of planting for the soil to weather to a suitable seedbed.

This soil is well suited to bottom land hardwood trees, but only a few small areas remain in woodland. Once seedlings are established, they grow well, but some seedling mortality is likely. Controlling plant competition helps seedling growth. Harvesting is limited to periods of low rainfall. Excess surface water is generally removed by drainage ditches.

This soil is poorly suited to most building site development and sewage disposal systems. Where overflow is controlled, it is suitable for sewage lagoons and pond reservoirs. Basements should not be constructed unless specially designed to prevent damage from wetness and shrink-swell of the soil. Footings and foundations also need to be designed to withstand the shrink-swell of the soil. This soil is poorly suited to local roads because of shrink-swell and wetness. If local roads are built, suitable

road base material is needed . Alligator soils are also poorly suited to septic tank absorption fields because of very slow permeability and wetness. Sewage is best managed by using a lagoon.

This soil is in capability subclass IIIw and woodland ordination group 2w.

Ak—Alligator-Steele complex. This map unit consists of the poorly drained Alligator soil and the moderately well drained Steele soil. It is typified by low convex sand spots and ridges of Steele soil surrounded by lower lying Alligator soil. It is on nearly level areas of large basins and drains. Areas are generally about 20 to 1,000 acres or more. The unit contains about 70 percent Alligator soil and about 30 percent Steele soil. The soils are mapped together because they are in such an intermingled pattern that it is not feasible to map them separately.

Typically, the Alligator soil has a surface layer of very dark grayish brown silty clay loam about 7 inches thick. The subsoil is about 42 inches of dark gray and light brownish gray, firm clay. The underlying material is dark gray and gray clay to a depth of 60 inches or more. Many small depressional areas have a clay surface layer.

Typically, the Steele soil has a surface layer of dark brown loam and fine sandy loam about 9 inches thick. Below this is pale brown, loose, single-grained loamy sand about 16 inches thick. The next layer is about 6 inches of dark grayish brown fine sandy loam. Below this, to a depth of 85 inches, is gray clay. Many areas that have a loamy sand surface layer are adjacent to the loam areas. In some areas the clayey subsurface layer is closer to the surface because part of the surface layer has been removed.

Included with these soils in mapping are areas of Sharkey soil, which makes up about 10 percent of the unit. This included soil is in low drains where the reaction is less acid.

Permeability of the Alligator soil is very slow, and available water capacity is moderate. This soil has medium inherent fertility and very slow runoff. Organic matter content is low. Reaction is strongly acid or very strongly acid except where the soil is limed. In areas that are limed, reaction ranges from medium acid to neutral. The shrink-swell potential is very high.

The Steele soil is rapidly permeable in the upper layers and slowly permeable in the clayey layers. There is little or no runoff because of the sandy upper layers. Organic matter content is moderately low, and natural fertility is low to medium. Available water capacity is moderate, and during wet periods the soil is saturated or has a perched water table above the clayey layers.

This unit is suited to row crops, pasture, and hay crops and some woodland. It has good potential for and is used to grow soybeans, cotton, and wheat. The Alligator soil is difficult to work into a suitable seedbed, and tillage needs to be carried out far enough in advance of planting so the soil has time to weather. Artificial drainage, either by surface ditches or landforming, helps to alleviate wetness. Areas of Steele soil are subject to wind erosion unless protected.

The small areas in woodland are producing mostly bottom land hardwoods. The excessive wetness of the Alligator soil limits the use of equipment to dry periods. Ditches remove most excess surface water.

The Alligator soils are poorly suited to building site developments and sanitary facilities. They are, however, suited to sewage lagoons. Soils used for these purposes need to be protected from local ponding. Basements need to be specially designed to prevent damage from wetness and shrink-swell of the soil. Shrink-swell damage must also be considered in the designs for foundations and footings and in providing a suitable base for local roads.

The Steele soil has moderate limitations for most sanitary facilities and can be used for lagoons and water impoundments where the sandy layers are sealed with suitable material. This soil is poorly suited to most building site development.

Alligator soil is in capability subclass IIIw and woodland ordination group 2w. Steele soil is in capability subclass IIw and woodland ordination group 3s.

Ba—Baldwin silty clay loam. This level and nearly level, poorly drained soil is on flat ridges or basins in slight depressions. Individual areas are somewhat elongated and generally are irregular in shape. They are about 10 to 200 acres or more.

Typically, the surface layer is very dark grayish brown silty clay loam about 7 inches thick. The subsoil is about 46 inches thick and mottled; the upper 5 inches is dark gray, firm silty clay loam, and the lower part is dark gray and olive gray, firm silty clay and silty clay loam with brown mottles. The substratum is olive gray silty clay loam and silty clay to a depth of 60 inches or more. In areas where the surface has been reworked by landforming or where potholes have been filled, the surface layer is thicker or thinner than is typical.

Included with this soil in mapping are small areas of somewhat poorly drained Crowley soil. This included soil occupies slightly convex areas that are a little higher in elevation than the Baldwin soil and makes up about 5 to 10 percent of the unit.

Permeability and surface runoff are very slow, and small areas are ponded during wet periods. In places the surface layer is neutral in reaction because of local liming and irrigation practices. Reaction is medium acid or slightly acid in the upper part of the subsoil. Natural fertility is high, and organic matter content is moderately low.

This soil is easily tilled. Tillage, however, results in clods if the soil is worked when too wet, and the soil tends to puddle and crust after hard rains. It cracks when dry, but the cracks swell back together when the soil is wet. Available water capacity is high.

This soil has good potential for cultivated crops and summer annuals, hay, pasture, and trees. It has poor potential for most engineering uses except for sewage lagoons.

This soil is suited to soybeans, cotton, grain sorghum, grasses and legumes, and pasture and hay. Most areas are used for cultivated crops, and often require the removal of excessive water. Field ditches can be used to remove excess surface water. Landforming enhances surface drainage, eliminates potholes, and can provide a suitable grade for supplemental irrigation. Managing crop residue to provide a protective surface cover and returning the rest to the soil help maintain fertility and reduce crusting. This soil holds a large amount of water, but only part is available to plants. A water table perches above the very slowly permeable subsoil following heavy rains.

Only a small acreage of this soil is used for pasture and hay. Good management includes proper stocking rates and restricted use during wet periods. Grazing, overgrazing, or using hay equipment when the soil is wet results in compaction and poor tilth.

This soil is well suited to selected bottom land hardwood trees, but only a few areas remain in woodland. Cuttings and seedlings grow well once established, but there may be moderate seedling mortality in certain species because of wetness. Surface ditches or bedding of tree rows generally provides surface drainage. However, there is a limitation for machine planting or harvesting because of wetness, and harvesting is restricted to summer and fall.

Natural wetness and shrink-swell of the subsoil impose severe limitations for building site development. If used for these purposes, the soil needs to be artificially drained and protected from local ponding. Buildings ought to be constructed without basements or designed to overcome the problem of wetness and shrink-swell. Footings and foundations, too, should be designed with these problems in mind.

The Baldwin soil is poorly suited to septic tank filter fields because of shrink-swell, very slow permeability, and wetness. Sewage is best treated in a lagoon. Uncoated steel is very liable to corrode in this soil. Base materials for roads should be strengthened by adding suitable fill to withstand the shrink-swell action.

This soil is in capability subclass IIIw and woodland ordination group 2w.

BeA—Beulah fine sandy loam, 0 to 2 percent slopes. This nearly level, somewhat excessively drained soil is on natural levees. Some areas are in concave natural drains; some are irregular or elongated. They are about 10 to 100 acres or more.

Typically, the surface layer is dark brown fine sandy loam about 7 inches thick. The subsoil is about 28 inches thick and is dark yellowish brown and dark brown, very friable fine sandy loam. Pale brown mottles are in the lower part of the subsoil. The substratum is dark yellowish brown and dark brown loamy fine sand to a depth of 60 inches or more. In places the surface layer is loamy fine sand, and in some areas it is very dark grayish brown.

Included with this soil in mapping are small areas of the well drained Bosket soil and the excessively drained Malden soil. Bosket soil is mainly in drainageways, and Malden soil is on the higher sand ridges. The included soils make up 5 to 10 percent of the unit.

Permeability is moderately rapid. Runoff of surface water is slow since most of the water is absorbed into the surface. The available water capacity and inherent fertility are moderate. Reaction is strongly acid to medium acid in the subsoil but is slightly acid or neutral in the surface layer and upper part of the subsoil because of local liming practices. Organic matter content is moderately low. The surface layer is very friable and is easy to work through a wide range of moisture. Areas between the St. Francis River and its levee are subject to overflow, but most areas of this soil are on the higher elevations that are less susceptible to flooding.

Most areas are used for cultivated crops. This soil has good potential for row crops, small grains, pasture and hay, trees, and special crops such as watermelon and cantaloupe. This soil is suited to cotton, soybeans, wheat, rye, vetch, strawberries, and other food crops. Use of the soil for pasture or hay crops is restricted to small areas close to farmsteads. Overgrazing generally results in reduced pasture yield. Proper stocking rates and timely delay of grazing are needed to help maintain pastures in good condition.

Wind erosion is a slight hazard where large areas are not protected, though cover crops and wind stripcrops can be used for protection (fig. 15). Minimum tillage, cover crops, and practices to maintain or build organic matter content help improve fertility, reduce crusting, and increase water intake. This soil tends to be droughty during long dry periods. Some areas have been graded, and irrigation is needed to supplement moisture.

This Beulah soil is well suited to selected bottom land trees, but only a few areas are in woodland. Tree seedlings and cuttings survive and grow well once established, but some seedling mortality can be expected, particularly in long dry periods. Plant competition generally can be controlled by spraying. There are no limitations for the use of heavy equipment on this soil.

The soil has fair to poor potential for most sanitary facilities, except for septic tank filter fields, for which it has good potential. It has fair to good potential for most engineering uses.

This soil is suitable for building site development and for onsite sewage disposal where the volume can be handled with a filter field. Where lagoons are installed, it is necessary to seal the reservoir to prevent seepage. Banks of excavations are unstable and slough easily, but

shored sides or flattened side slopes help to overcome this sloughing.

This soil is in capability subclass IIs and woodland ordination group 2o.

BeB—Beulah fine sandy loam, 2 to 5 percent slopes. This gently sloping, somewhat excessively drained soil is on toe slopes of the east side of Crowleys Ridge. Areas generally are elongated and parallel to the ridge and are about 10 to 200 acres or more.

Typically, the surface layer is dark brown fine sandy loam about 9 inches thick. The subsoil is about 40 inches thick. It is dark yellowish brown, strong brown, and dark brown, friable fine sandy loam and has a few pebbles. The substratum is dark yellowish brown gravelly sandy loam to a depth of 60 inches or more. Some areas have a loamy fine sand surface layer or contain more sand throughout the profile. Some areas have a thinner subsoil. The soil along drainageways has a thick sandy surface layer.

Included with this soil in mapping are small areas of the well drained Bosket soil and soils that have gravel in the substrata. The included soils make up about 15 percent of the unit.

Permeability is moderately rapid, and runoff is slow. The available water capacity and natural fertility are moderate. Reaction is strongly acid or medium acid in the subsoil, but the surface layer is slightly acid in places because of liming. Organic matter content is moderately low. The surface layer is very friable and easily tilled through a fairly wide moisture range.

This soil has fair to good potential for row crops, pasture and hay, and trees. It has fair to good potential for most engineering uses.

About half of the acreage is cultivated. The rest is mainly in pasture. This soil is suited to wheat, soybeans, and cotton and fairly well suited to pasture and hay. Wind erosion is a slight hazard on large unprotected areas. Where the soil is cultivated, there is a hazard of erosion. Pasture and hay, minimum tillage, or no-till help prevent excessive soil loss. Cover crops and wind stripcrops help control wind erosion. The soil tends to be droughty for long periods, especially where the subsoil is thinner. Incorporating crop residue into the soil and leaving a part on the surface help to protect the soil from erosion, to maintain organic matter content, and to improve fertility. Mechanical practices such as terraces, diversions, and waterways are also needed in places.

Overgrazing or grazing when the soil is too wet causes surface compaction and poor tilth. Timely delay of grazing and restricted use during wet periods are good management practices. Droughtiness during long dry periods causes stand reduction in some years.

This soil is well suited to growing selected trees, but only isolated areas are in woodland. Some small areas have been planted to pine and Christmas trees. Tree seedlings and cuttings survive and grow well once established, and there are few or no hazards to planting or harvesting.

This soil is well suited to building site development and onsite sewage disposal where the volume can be handled with a filter field. Buildings need to be located away from local drainageways. Where lagoons are used, the reservoir should be sealed to prevent seepage. Banks of excavations are unstable and slough easily, and shored sides or flattened side slopes help to stabilize the cutbanks.

This soil is in capability subclass IIs and woodland ordination group 2o.

Bk—Bosket fine sandy loam. This nearly level, well drained soil is on high, broad natural levees. Most of this unit is on slightly convex side slopes, but a few areas are in slightly concave dips or drains. Areas are about 10 to 500 acres or more and are generally somewhat elongated in a northeast to southwest direction.

Typically, the surface layer, about 9 inches thick, is very dark grayish brown fine sandy loam. The subsurface layer is dark yellowish brown, friable fine sandy loam about 9 inches thick. The subsoil is dark brown and about 32 inches thick, the upper part being friable sandy loam and the lower part clay loam and sandy clay loam. The substratum is yellowish brown loamy fine sand to a depth of 62 inches or more. Some areas have a thicker surface layer and others contain more silt.

Included with this soil in mapping are small areas of the somewhat excessively drained Beulah soil, the well drained Dubbs soil, and the moderately well drained Farrenburg soil. Beulah soil is in the sandier areas. Dubbs soil is on positions similar to Bosket soil, but Dubbs soil contains more silt and less sand than Bosket soils. Farrenburg soil is in depressional drainageways that accumulate runoff. These included soils make up about 10 percent of the unit.

Permeability is moderate. Surface runoff is slow to medium, and available water capacity is moderate or high. The inherent fertility is medium to high, and organic matter content is moderately low. The surface layer is strongly acid to slightly acid but in places is mildly alkaline because of local liming practices or addition of irrigation water. The surface layer is very friable and easily tilled within a wide range of soil moisture. After hard rains, however, the Bosket soil has a tendency to puddle and crust.

This soil has good potential for row crops, hay, pasture, trees, and special crops. Except for the possibility of seepage in impoundments, it has good potential for most engineering uses.

Most areas are used for row crops. This soil is well suited to cotton, corn, soybeans, wheat, grain sorghum, and pasture and hay crops. There are few limitations for crop growth. However, only a small acreage is used for pasture and hay crops. Winter cover crops of wheat or rye and vetch are sometimes grazed. Areas used for

permanent pasture are often seeded to fescue or bermudagrass. Temporary summer pasture is ordinarily hybrid sorghum. Proper stocking rates, pasture rotation, and restricted use when the soil is wet help maintain pasture in good condition.

Large open areas have a slight hazard of wind erosion, but this may be controlled by wind stripcrops and cover crops. Residue management helps to provide a protective cover on the surface, to maintain or improve soil tilth, and to reduce wind erosion.

This soil is well suited to growing trees, and most woodland areas are the result of earlier plantings. Pecan plantings are common. Plant competition presents the only major problem in growing trees. It can be controlled by spraying.

This soil is suitable for building site development and for onsite waste disposal. Where lagoons are installed, it is necessary to seal the reservoir to prevent seepage.

This soil is in capability class I and woodland ordination group 2o.

BrB—Broseley loamy fine sand, 2 to 5 percent slopes. This gently undulating, well drained and somewhat excessively drained soil is on convex sandy natural levees. Areas are generally long and narrow and oriented in a northeasterly direction. They are about 5 to 100 acres.

In a typical profile, the surface layer is about 10 inches of dark brown, very friable loamy fine sand. The subsurface layer is about 22 inches of very friable, dark brown loamy fine sand. The subsoil is about 24 inches thick and is dark yellowish brown and dark brown, firm sandy clay loam and fine sandy loam. The lower part of the subsoil has a few pale brown mottles. The substratum is yellowish brown loamy fine sand to a depth of 60 inches or more. Some areas have a thicker surface layer. This extra surface thickness generally is associated with areas that accumulated deposits from wind erosion.

Included with this soil in mapping are small isolated areas of the well drained Bosket soil and the excessively drained Malden soil. Bosket soil is less sloping and is not so sandy in the upper layers. Malden soil is on the sandy areas but does not have the loamy subsoil. These inclusions make up about 10 percent of the unit.

Permeability is moderately rapid; however, water and air move through the surface and subsurface layers at a higher rate than through the subsoil. The available water capacity is moderate, and there is little surface water runoff because of the high infiltration rate of the surface. Since inherent fertility is medium and organic matter content is low, these soils respond well to the addition of nutrients. The subsoil is strongly acid to slightly acid, but the surface and subsurface layers are neutral in places as a result of local liming practices. The surface layer is easily tilled through a wide range of moisture conditions. It has a slight tendency to puddle and crust following heavy rains. Large sand particles, separated by rain, are easily moved by wind erosion.

This soil has good potential for cultivated crops, pasture and hay, cotton, soybeans, wheat and other small grains, such special crops as watermelons and cantaloupes, and other fruits and vegetables. This soil has fair to good potential for most engineering uses except for sewage lagoons and landfills.

Most areas are used for cultivated crops. Where watermelons and cantaloupes are planted, interrow areas are generally planted to a cover crop that protects the young seedlings, shades out weeds, and later serves as mulch.

Since this soil is slightly droughty during long dry periods, there are some problems in establishing vegetation in summer. Residue management and frequent watering help overcome these hazards, and once plants are established they do well. The hazard of wind erosion on cultivated soils is lessened if these soils are protected by wind stripcrops, cover crops, and field windbreaks. Management that leaves some residue on the surface and incorporates the rest into the soil helps improve fertility, reduce soil blowing, and increase water infiltration.

Areas that are graded are generally easily eroded by wind and are often supplementally irrigated. Areas between the St. Francis River and its levee are subject to overflow, but most areas of this soil are on higher elevations that are less susceptible to flooding.

Though pasture and hayland appear infrequently on this soil, they are effective in helping to control wind erosion. Some reduction in stand or difficulty in establishing pasture is likely in dry periods because of the lack of available water. Overgrazing, especially during long dry periods, also results in stand reduction. Proper stocking rates and timely delay of grazing are good management practices.

This soil is moderately well suited to selected bottom land hardwood trees, but only a few small isolated areas are in native woodland. Some areas have been planted to pecans. Tree seedlings survive and grow well if they are protected from wind erosion until established. There are no limitations to planting or harvesting trees on this soil. Where good drainage and aeration are available, this soil has potential for nursery use.

Building site developments have few limitations. Onsite disposal of waste presents little problem since this soil is suitable for septic tank absorption fields. Where lagoons are installed, it is necessary to seal the bottom and sides of the reservoir to avoid seepage.

This soil is in capability subclass IIs and woodland ordination group 3s.

Ca—Cairo silty clay. This nearly level and level, poorly drained soil is in concave drains, channels, and basins. Areas are seldom more than a quarter mile wide but generally are several miles long. They are about 20 to 1,000 acres or more.

Typically, the surface layer is black silty clay about 10 inches thick. The subsoil is about 25 inches of black, firm silty clay. The substratum, to a depth of more than 60 inches, is dark gray and brown, mottled, single grained loamy sand. In areas where soil material has eroded from adjacent higher positions and been deposited on Cairo soil, the surface layer is silty clay loam. Also, in places the sandy substratum is more than 40 inches beneath the surface. Some areas have layers of concretions and organic materials at the contact point of the clay and sand.

Included with this soil in mapping are small areas of Roellen and Sikeston soils. These soils are in positions similar to Cairo soil. Roellen soils do not have the sandy substratum, and Sikeston soils have less clay and more sand. The included soils make up less than 10 percent of the unit.

Permeability of Cairo soil is very slow in the clayey layers and rapid in the sandy substratum. Runoff is slow. Cairo soil accumulates runoff from higher elevations and is ponded following intense rains. Reaction of the surface layer varies according to liming practices. The natural fertility is high. Organic matter content is moderate or high, and available water capacity is moderate. The surface layer is difficult to till, and tillage with optimum moisture is essential to maintain or improve soil structure. The surface tends to run together, forming a seal when the structure is destroyed. Early tillage permits soil aggregates to weather and benefits seedbed preparation. The surface layer and upper part of the subsoil crack when dry and swell when wet. Deep root development is restricted by the sandy substratum, where a water table is present for much of the year.

This soil has good potential for summer annuals. It has fair potential for perennials and good potential for those plants that tolerate wetness. It has good potential for trees but poor potential for most engineering uses.

Most areas are used for cultivated crops, but some areas are used for pasture. This soil is suited to soybeans, cotton, and grain sorghum. Wheat is grown successfully where artificial drainage is adequate. Wetness and the clayey nature of this soil are the main management concerns. Use for pasture and hay is limited, and most pastures are small. Overgrazing, or grazing when the soil is wet, results in compaction and poor tilth. Proper stocking rates, timely grazing, and restricted use during wet periods are good management practices.

Two major management concerns are the accumulation of runoff from higher positions in the watershed and the very slow permeability. This soil holds large amounts of water, but only a moderate amount is available to plants. The water table in the sandy substratum must be considered in establishing field ditches and landforming but presents only a small limitation to annuals. Field ditches or landforming generally are the best solutions to wetness. Management that leaves some residue on the surface and incorporates the rest into the soil helps reduce crusting and improve tilth.

This soil is well suited to growing selected bottom land hardwood trees. A few areas are in native woodland. Most areas are in cypress, gum, and water-tolerant oak species. Tree cuttings and seedlings have difficulty surviving the first few years but, once established, grow well. Seedling mortality can be reduced by providing drainage and preparing a good seedbed, and plant competition can be controlled by burning, spraying, cutting, or girdling. The wetness and clayey texture of this soil impose limitations on equipment uses. Summer and early fall are the best times for harvesting.

This soil has severe limitations for most building site development because of its wetness and shrink-swell. However, if buildings are constructed, the foundations and footings need to be designed to prevent damage from shrinking and swelling. Knowledge of the overflow history helps in handling the runoff that accumulates. The shrink-swell, coupled with the very slow permeability and wetness, makes this soil poorly suited to the use of septic tank absorption fields. The soil is suitable for sewage lagoons if the bottom of the lagoon is in the clayey layers; however, where the bottom is on or near the sand, it may be necessary to use a synthetic product or a seal with clayey soil to prevent seepage. Base materials of local roads need to be strengthened to overcome the shrink-swell of this soil.

This soil is in capability subclass IIIw and woodland ordination group 2w.

Ch—Calhoun silt loam. This nearly level, poorly drained soil is on terraces. Areas are generally elongated and are about 10 to 200 acres or more.

Typically, the surface layer is dark grayish brown, friable silt loam about 6 inches thick. Areas that have been recently cleared or cultivated for only a few years generally have a surface layer about 4 inches thick. The subsurface layer is grayish brown and light gray, friable silt loam about 7 inches thick. It has grayish and brownish mottles. The subsoil is about 45 inches thick and is mostly grayish brown and light brownish gray, firm silty clay loam. The lower part of the subsoil is grayish brown silt loam about 7 inches thick with mottles in shades of gray and yellowish brown. Pockets of silt loam subsurface material are intermixed with the subsoil. The underlying material is grayish brown silt loam to a depth of 60 inches or more. The subsurface layer is thinner and is less acid in places.

Included with this soil in mapping are the somewhat poorly drained Crowley soil and the well drained Dubbs soil. Crowley soil is in lower lying drains and basins. The Dubbs soil is on small mounds or ridges. The included soils make up about 5 to 8 percent of the unit.

Permeability of this soil is slow, and surface runoff is slow or very slow. Reaction is strongly acid or very strongly acid in the upper part of the subsoil and neutral

in the lower part. Reaction is medium acid through very strongly acid in the surface, and in places, because of local liming or irrigation practices, it is slightly acid through mildly alkaline. Inherent fertility is medium, and this soil responds well to the addition of lime and fertilizer. Organic matter content is low. The friable surface layer has good tilth and is easily worked. It tends to crust and puddle when worked while wet or after hard rains. Available water capacity is high or very high. A perched water table is above the subsoil during wet periods. Areas between the St. Francis River and its levees are subject to overflow.

The soil has good potential for rice and selected pasture and hay crops. It has fair potential for trees but poor potential for most engineering uses.

Most areas of this soil are used for row crops. Soybeans are the main crop. Grain sorghum, corn, cotton, and wheat are also grown. This soil is suitable for growing most crops common to the county but tends to be wet. Excess surface water can normally be removed by a system of field and lateral ditches, except where there are potholes. Landforming helps to eliminate potholes, enhances surface drainage, and provides a suitable grade for supplemental irrigation. Residue management that leaves a protective surface cover helps reduce surface crusting and improve fertility and water intake.

Areas used for pasture or hay are generally small and are easily compacted if grazed or worked when the soil is wet. Grazing when the soil is wet also leads to poor tilth and a reduced stand. Proper stocking rates, timely delay of grazing, and deferment of hay cutting during wet periods are good management practices.

This soil is moderately well suited to growing bottom land trees, and a few areas are in native hardwoods. Tree cuttings and seedlings have difficulty surviving the first few years because of wetness, but once established, selected species grow well. Surface drainage by field ditches or bedding of tree rows helps to overcome seedling mortality. The time suitable for planting or harvesting is limited because of the wetness and the water table.

This soil is poorly suited to building site development and sanitary facilities because of the inherent wetness. Local sewage is best treated in a sewage lagoon because of the slow permeability of the subsoil. Road bases need to be strengthened with suitable material.

The soil is in capability subclass IIw and woodland ordination group 3w.

Cn—Canalou loamy fine sand. This nearly level, moderately well drained soil is on convex ridges and in drains on natural levees. Areas are about 10 to 200 acres or more. Most are islandlike areas surrounded by more poorly drained soils.

Typically, the surface layer is dark brown loamy fine sand about 9 inches thick. The subsoil is about 36 inches thick and very friable. The upper part is dark brown loamy fine sand with a few yellowish brown mottles. The middle part is dark yellowish brown fine sandy loam that has brownish gray mottles. The lower part of the subsoil is dark yellowish brown, very friable loamy fine sand. It has light brownish gray mottles. The substratum is dark yellowish brown and brown sand and loamy sand to a depth of 60 inches or more and is mottled in shades of gray and brown. Where wind has made deposits, the surface layer is thicker and generally contains more sand.

Included with this soil in mapping are small areas of the somewhat excessively drained Beulah soil and the excessively drained Malden soil. Beulah soil is on the flatter natural levees, and Malden soil is in a higher landscape position. The included soils make up less than 10 percent of the unit.

Permeability of Canalou soil is moderately rapid. Most precipitation is absorbed into the sandy surface, so runoff is slow. The available water capacity is low. The subsoil is strongly acid to slightly acid, but the surface layer is neutral in places because of local liming practices. Natural fertility is medium, and organic matter content is moderately low. The surface layer is very friable and easily tilled through a wide range of soil moisture. The water table fluctuates in the lower part of the subsoil and in the substratum during wet periods.

This soil has good potential for growing crops commonly adapted to the county and for pasture and hay. It has fair potential for trees. It has poor to fair potential for most engineering uses.

Most areas are used for cultivated row crops. This soil is suited to cotton, soybeans, wheat, grain sorghum, peas, watermelons, and cantaloupes. Concave drainageways that accumulate runoff from higher positions sometimes are flooded for a very short time, but ordinarily flooding is not a problem.

This soil is subject to wind erosion where not protected, and most of the damage is done to young crops by the moving sand particles. However, erosion is not a serious problem and can be controlled by cover crops, wind stripcrops, or field windbreaks. Conserving crop residues helps to retard blowing and increase infiltration and fertility. Areas along the St. Francis River or between the river and its levee are subject to overflow. The Canalou soil outside of the levee but adjacent to it is seepy and has a high water table during periods when the water level in the river is high, but it is somewhat droughty during hot, dry periods. Most of the corn grown on this soil is irrigated (fig. 16).

This soil has moderate to severe limitations for building site developments because of the fluctuating water table. It has severe limitations for sanitary facilities except for landfill cover material. Because of the rapid permeability, there is a hazard of polluting local ground water where septic tank and filter fields are used. Sewage lagoons in this soil need to be properly sealed.

This soil is a good base for roads and is fairly well suited to dwellings and buildings without basements.

This soil is in capability subclass IIIs and woodland ordination group 3s.

Co—Collins silt loam. This nearly level, moderately well drained soil is in flood plains and drains of uplands and on natural levees of streams flowing from upland positions. Areas of the soil follow the drains or occupy natural levee positions adjacent to the streams. They are about 10 to 200 acres or more.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. Below the surface layer is stratified or thinly layered dark brown and dark yellowish brown, very friable silt loam about 13 inches thick. Below this is about 10 inches of dark yellowish brown, very friable silt loam mottled with light brownish gray. The next layer is about 21 inches of grayish brown, friable silt loam mottled with dark brown. The substratum is gray silt to a depth of 60 inches or more. In some areas the depth to mottles is greater.

Included with this soil in mapping are small areas of the somewhat poorly drained Falaya soil. Falaya soil occupies lower elevations and wider drains lower in the drainage pattern. It makes up less than 10 percent of the unit.

Permeability of the Collins soil is moderate, and surface runoff is slow. The surface layer is strongly acid or very strongly acid, and in places, because of local liming practices, it is slightly acid. The underlying layers are strongly acid or very strongly acid. Natural fertility is high, and organic matter content is low. Available water capacity is very high. The water table generally rises to within 20 to 40 inches of the surface during the high rainfall season. The surface layer is very friable and easily tilled through a fairly wide range of moisture.

This soil has good potential for growing cultivated crops, hay, pasture, trees, and fruit crops. It has fair to good potential for sanitary facilities, but soil wetness imposes a problem on building sites.

Most areas of this soil are used for row crops. This soil is well suited to soybeans, cotton, corn, wheat, grain sorghum, and grasses and legumes for hay and pasture. Short duration flooding and overflow from higher positions are the main management concerns. However, most excess water stands for only a few hours before being removed by local drainageways. Residue management that leaves a protective cover on the surface and incorporates some crop residues into the soil helps maintain organic matter content and tilth. Areas along the St. Francis River or between the St. Francis River and its levees are subject to overflow.

Part of the acreage is used for growing grasses and legumes for pasture or hay. Working or grazing pastures when wet causes surface compaction and results in poor tilth. Timely delay of grazing and restricted use during wet periods help to maintain the pasture in good condition.

This soil is well suited to bottom land trees, and a few areas remain in native hardwoods. There are few limitations to woodland where plant competition is controlled. Competing plants can be controlled by spraying, site preparation, cutting, or girdling.

Peaches, nectarines, apples, and other fruit trees are also grown. Except for deep rooted trees, there is only a slight limitation for plants because of wetness.

This soil is not suitable for building site development unless steps are taken to alleviate the overflow hazard. It is suitable for most sanitary facilities where it is protected from overflow. It lacks sufficient strength to support heavy vehicular traffic, but this limitation can be overcome by adding suitable road base material.

This soil is in capability class I and woodland ordination group 1o.

Ct—Cooter silty clay. This nearly level, moderately well drained soil is in concave drainageways and channels of an ancient drainage system. Most areas are associated with the old Little River channel, are long and narrow, and are about 10 to 100 acres or more.

Typically, the surface layer is very dark grayish brown silty clay about 12 inches thick. The substratum is brown and dark yellowish brown, mottled, loose sand to a depth of 60 inches or more. In places the clayey surface layer is less than 12 inches thick. Tillage practices and landforming have added a thin mantle of more loamy material to the surface of this soil.

Included with this soil in mapping are small areas of the poorly drained Alligator, Gideon, and Sharkey soils and areas of water. Gideon soil is in the drainageways, and Alligator and Sharkey soils are adjacent to the drainageways. Water areas are in the drainageways. These inclusions make up about 5 to 10 percent of the unit.

Permeability is slow in the clayey layers in the upper part of the profile and rapid or very rapid in the sandy layers. Surface runoff is slow. The subsoil ranges from medium acid to neutral, but the surface layer is mildly alkaline in places because of local liming practices. Natural fertility is medium, and organic matter content is moderately low. Available water capacity is low, and the surface layer is firm and difficult to work into a suitable seedbed. This soil can be tilled within a narrow moisture range.

Most areas of this soil are used for cultivated crops and are farmed with the adjacent soils. Few are large enough to be effectively managed separately. The soil has fair to good potential for cultivated crops and trees and has poor to fair potential for pasture and hay. It has poor potential for most engineering uses.

This soil is fairly well suited to soybeans, grain sorghum, and other summer annuals. Other crops, including perennials, commonly have some loss of stand because of local ponding. Wetness is the main management con-

cern. Since this soil is on the lower elevations, it functions as the natural drainageway for a large surrounding area. Ditches are the most widely used solution for drainage. A water table is in the substratum much of the year but drops during dry periods. During extended dry periods this soil is droughty.

This soil is used very little for pastureland or hayland. Grazing when the soil is wet causes surface compaction and poor tilth, but timely delay of grazing during wet periods helps to maintain pasture in good condition.

This soil is moderately well suited to bottom land trees, but only a few areas remain in native bottom land hardwoods. Tree seedlings and cuttings grow fairly well, once established, but the natural wetness generally causes some seedling mortality. Excess surface water generally can be removed by field ditches where an outlet is adequate. The wetness and the landscape position of this soil are limitations to harvesting.

This soil is poorly suited to building site development and onsite waste disposal. Wetness, combined with ponding and high shrink-swell of the surface layer, limits most building site development and waste disposal. Buildings should be located elsewhere if possible.

This soil is in capability subclass IIw and woodland ordination group 3c.

Cw—Crowley silt loam. This soil is in drainageways, slightly concave basins, and flat terraces or benches. It is somewhat poorly drained and nearly level. Areas are broad and are about 30 to several thousand acres.

Typically, the surface layer is dark grayish brown, very friable silt loam about 8 inches thick. Those areas recently cleared generally have a surface layer about 4 inches thick. The subsurface layer is friable, light gray silt loam about 11 inches thick. The subsoil is about 37 inches thick; the upper part is dark gray, firm silty clay with red mottles, and the lower part is mottled, grayish brown, firm silty clay and silty clay loam. The underlying material is mottled, grayish brown silty clay loam to a depth of more than 60 inches. Some areas do not have a subsurface layer. Where trees were windrowed and burned, the soil has a darker surface layer.

Included with this soil in mapping are the well drained Dubbs soil and the poorly drained Calhoun soil. Dubbs soil is on small ridges and mounds, and the Calhoun soil is on flat to slightly concave positions. The included soils make up about 7 to 10 percent of the unit.

Surface runoff is slow, and permeability is very slow in the subsoil. The subsoil is strongly acid to very strongly acid, and the surface layer is strongly acid to neutral because of local liming, irrigation, or tree-burn areas. The lower part of the subsoil has neutral reaction in places. The inherent fertility is medium, and organic matter content is low. The very friable surface layer has good tilth and can be tilled through a fairly wide range of moisture content. Available water capacity is high. The perched water table is above the subsoil during wet periods.

This soil has good potential for rice and selected pasture and hay crops and fair potential for trees. It has good potential for water-holding structures and poor potential for most engineering uses but has good potential for ponds and reservoirs.

This soil is suitable for growing most crops common to the county. Most areas of the soil are cultivated and are used for such row crops as soybeans, grain sorghum, corn, cotton, and wheat. Excess surface water generally is removed by field ditches or by landforming. Residue management that leaves protective cover on the surface helps reduce surface crusting and improve fertility and water intake. Large areas of this soil have been treated by land grading and supplemental furrow irrigation. Where drained, this soil has few limitations for row crops.

Only a small part of this map unit is used for pasture or hayland. Overgrazing or grazing when the soil is wet causes surface compaction, more runoff, and poor tilth. A proper stocking rate and timely delay of grazing are good pasture management practices.

This soil is moderately suited to bottom land trees, and the areas remaining in woodland produce hardwoods. Once seedlings are established, they grow well, but moderate seedling mortality is likely. Plant competition is somewhat of a concern but can be managed by site preparation and by controlled burning or spraying. Harvesting can be limited by wetness but generally is delayed a few days in summer. In winter and during wet periods, equipment limitations are severe.

This soil has severe limitations for sanitary facilities and building site developments. Sewage lagoons have only slight limitations. The clayey subsoil has a permeability too slow for good septic tank filter field disposal. Buildings need to be designed to overcome the limitations of soil wetness and the high shrink-swell of the subsoil. The soil does not have enough strength and shrinks and swells too much to be a good road bed, but these limitations can be overcome by adding suitable base material.

This soil is in capability subclass IIIw and woodland ordination group 3w.

Db—Dubbs silt loam. This nearly level, well drained soil is on broad natural levees or terraces and in some slightly concave, very slightly depressional natural drainageways. Areas are generally broad and are about 10 to several thousand acres.

Typically, the surface layer is dark brown silt loam about 7 inches thick. The subsoil is about 40 inches thick; the upper part is about 7 inches of dark brown, friable silt loam, and the lower 33 inches is dark yellowish brown and dark brown, firm silty clay loam. The substratum is yellowish brown loamy fine sand and loamy sand to a depth of 60 inches or more. In small depressional areas the surface layer is darker. A few small areas have a silty clay subsoil. There is a loamy

sand surface layer where soil material has been deposited by wind.

Included with this soil in mapping are small areas of Bosket, Farrenburg, and Silverdale soils. Bosket soil is well drained but has more sand than Dubbs soil. Farrenburg soil is moderately well drained and has more sand than Dubbs soil. The Silverdale soil has a sandy upper layer and is moderately well drained. The Farrenburg and Silverdale soils are in lower positions. The included soils make up less than 10 percent of the unit.

Permeability is moderate, and surface runoff is slow. Reaction is medium acid or strongly acid in the subsoil but is slightly acid or neutral in the surface layer because of local liming or irrigation practices. The natural fertility and available water capacity are high. Organic matter content is moderately low. The surface layer is friable and easily tilled. Unless protected, cultivated areas puddle and crust after hard rains.

Most areas are cultivated. This soil has good potential for growing cultivated crops, pasture and hay crops, and trees. It has fair potential for most engineering uses.

This soil is well suited to cotton, soybeans, wheat, corn and grain sorghum, and grasses and legumes for pasture and hay. There are no serious limitations for use as cropland; however, a protective residue cover helps maintain or improve soil fertility, increase water intake, and reduce crusting. Places between the St. Francis River and its levee are subject to overflow, but most areas of this soil are on slightly higher elevations and are less susceptible to flooding.

Only small areas of this soil are used for pasture and hay. Grazing when the soil is too wet causes compaction and poor tilth. Restricted grazing during these periods helps maintain the pasture and soil in good condition.

This soil is well suited to growing bottom land trees, but only a few areas are in woodland. It has some isolated native pecan trees. Plant competition is the main management concern on woodland, but this can be controlled by spraying or by prescribed burning. This soil has few limitations to planting or harvesting.

This soil is suitable for building site development and onsite waste disposal. Increasing the size of the absorption field helps to overcome the moderate permeability. Where lagoons are installed in or near the sandy substratum, it is necessary to seal the reservoir to avoid seepage.

This soil is in capability class I and woodland ordination group 2o.

De—Dubbs-Silverdale complex. This map unit consists of nearly level, well drained and moderately well drained soils on ridges and old natural levees. Areas are generally 15 to 2,000 acres or more. The Dubbs soil is typically on a relatively flat plain, and the Silverdale soil is in the numerous narrow, slightly concave depressions that dissect the plain. About 70 to 80 percent of this unit is Dubbs soil, and 15 to 30 percent is Silverdale soil. The soils are so intricately mixed or so small in extent that it was not feasible to map them separately.

Typically, the surface layer of the Dubbs soil is dark brown silt loam about 7 inches thick. The subsoil is about 40 inches thick. The upper part of the subsoil is friable, dark brown silt loam; and the lower part is firm, dark brown and dark yellowish brown silty clay loam. The substratum is yellowish brown loamy fine sand and loamy sand to a depth of 60 inches or more. In some places the surface layer contains more sand than is typical.

Typically, the surface layer of the Silverdale soil is dark brown loamy sand about 8 inches thick. Next is about 12 inches of loose brown sand over about 11 inches of mottled, dark grayish brown sand. Below this is grayish brown, mottled, friable silt loam. The substratum is light brownish gray silt loam and yellowish brown sand to a depth of 60 inches or more. In places the silt loam in the substratum is lighter in color than is typical.

Included with these soils in mapping are small areas of Bosket and Farrenburg soils and small areas of soils that have a sandy surface layer more than 40 inches thick. The included soils make up about 5 percent of the unit.

The Dubbs soil has moderate permeability. The available water capacity is high; surface runoff is slow.

The Silverdale soil has rapid permeability in the upper part of the subsoil and moderate permeability in the lower part of the subsoil. The available water capacity is moderate, and surface runoff is slow. The sandy upper layers are saturated following heavy rains and droughty during dry periods.

The subsoil is dominantly medium acid or slightly acid, but reaction varies widely because of local liming practices. Organic matter content is moderately low.

This map unit is suited to cotton, soybeans, wheat, and grain sorghum, and to grasses and legumes for pasture and hay. These soils are managed as one unit. The Silverdale soil is subject to wind erosion and is droughty during dry periods. In some areas it accumulates runoff for short periods following heavy rains. Draining these small areas is not generally practical because natural outlets are not available and ponding periods are short.

The Dubbs soil has no major limitation for crops. Areas between the St. Francis River and its levee are subject to overflow, but most parts of this unit are above ordinary overflow.

Wind erosion is a concern in establishment of stands. Overgrazing contributes to this condition. Cover crops, stripcrops, and managing residue help control wind erosion.

This map unit is suited to growing bottom land trees, but very few areas remain in woodland. Tree cuttings and seedlings grow well once established, but some difficulty can be expected on the Silverdale soil during dry periods. Plant competition can be controlled by spraying or prescribed burning. There are no major haz-

ards to planting or harvesting on the Dubbs soil, but wetness limits the use of equipment during wet periods on the Silverdale soil.

This map unit is poorly to fairly well suited to building site development and onsite waste disposal. Septic tank absorption fields function in the subsoil of the Dubbs soil. Increasing the size of the absorption field in the Dubbs soil helps to overcome the moderate permeability. The lower part of the Dubbs subsoil has a moderate shrink-swell potential, and the design and installation of construction should take this into account.

The Silverdale soil is poorly suited to building site development and onsite waste disposal. Septic tank absorption fields do not function in the Silverdale soil. The water table and inherent wetness are the major limitations.

Dubbs soil is in capability class I and woodland group 2o. Silverdale soil is in capability subclass IIIs and woodland ordination group 3s.

Dn—Dundee silt loam. This nearly level, somewhat poorly drained soil is in slightly concave drainageways or depressions and on natural levees and toe slopes. Most areas are gathering channels for larger natural drainageways. The levee positions are surrounded by more poorly drained soils. Individual areas range from broad and irregular to elongated and are about 5 to 300 acres or more.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsoil is about 42 inches thick and mottled. The upper 7 inches is grayish brown, friable silt loam, and the rest is dark grayish brown and grayish brown, slightly firm and firm silty clay loam. The substratum is grayish brown silt loam to a depth of 60 inches or more. Where sand has been deposited by wind, the surface layer is thicker and contains more sand. In narrow potholes the subsoil is finer textured. Some areas contain soils that have sandy substrata, and this soil west of Crowleys Ridge has a brown layer in the subsoil.

Included with this soil in mapping are small areas of the moderately well drained Canalou and Silverdale soils and the somewhat poorly drained Lilbourn soil. Canalou soil is on convex ridges, Silverdale soil is in small concave basins, and Lilbourn soil is on low natural levees or in drains. The included soils make up about 10 percent of the unit.

Permeability of this soil is moderately slow, and runoff is slow in depressions and medium on convex natural levees. Reaction of the subsoil is medium to very strongly acid but is neutral in places because of local liming and irrigation practices. Natural fertility is medium, and organic matter content is moderately low. The available water capacity is high. The surface layer is friable and easily tilled through a fairly wide range of soil moisture, but if it is tilled when wet or exposed to hard rains, it tends to puddle and crust. This soil has a water table at a depth of about 18 to 24 inches during wet winter and spring months. Areas between the St. Francis River and its levee are subject to overflow.

This soil has good potential for most annual crops, hay, and pasture. It has good potential for bottom land tree production, and it has fair to poor potential for most engineering uses.

Most areas are used for continuous cultivation. This soil is suited to cotton, soybeans, wheat, grain sorghum, and legumes and grasses for hay and pasture. Wetness is the main management concern. Because of its position on the landscape, this soil collects runoff from surrounding higher elevations, but most surface water can be removed by a system of surface ditches or landforming. Tilling when the soil is wet destroys its tilth and results in compaction, but managing crop residue to provide a protective surface cover helps maintain fertility, organic matter content, and tilth.

Only a small part of this map unit is used for pasture and hayland. Overgrazing or grazing when the soil is wet causes compaction and poor tilth. Proper grazing and restricted use when the soil is wet are good mangement practices.

This soil is well suited to growing bottom land trees, but only a few areas are in woodland. Tree seedlings and cuttings survive and grow well if plant competition is controlled. Competing plants can be controlled by site preparation, spraying, or girdling. There is a moderate hazard in using equipment to plant or harvest. Planting and harvesting should be avoided during wet periods.

The high water table and moderate permeability make this soil poorly suited to most building site developments and sanitary facilities. Dwellings and small buildings without basements function satisfactorily when protected from wetness. Where the upper layers are removed, the exposed subsoil tends to shrink and swell, so buildings need to be constructed with sufficient reinforcement. Septic tank absorption fields function during dry weather but fail during wet periods, and waste is best treated in a lagoon. Roads can be constructed to overcome the moderate shrink-swell of the soil by the addition of suitable base material.

This soil is in capability subclass IIw and woodland ordination group 2w.

Ds—Dundee-Silverdale loamy sands. This map unit consists of deep, nearly level, somewhat poorly drained and moderately well drained soils. The area is typified by broad plains of the somewhat poorly drained Dundee soil with numerous slightly concave depressions of Silverdale soil. Areas are about 10 to several thousand acres. The unit contains from 50 to 65 percent Dundee soil and 25 to 50 percent Silverdale soil. These soils are so intricately mixed or so small in extent that it was impractical to separate them in mapping.

Typically, the Dundee soil has a surface layer of dark brown loamy sand about 9 inches thick. The subsoil is

about 47 inches thick. The upper 9 inches is friable, mottled, grayish brown silt loam; the middle 17 inches is firm, mottled, grayish brown silty clay loam; and the lower 21 inches is friable, mottled, grayish brown silt loam. The substratum is loose, grayish brown and strong brown loamy fine sand to a depth of 60 inches or more. In places the surface layer is 14 inches thick. In some areas the lower part of the subsoil is browner and is slightly acid or neutral.

Typically, the Silverdale soil has a surface layer of dark brown loamy sand 8 inches thick. The next 23 inches is brown and dark grayish brown, mottled, loose sand. Beneath this is grayish brown and light brownish gray, friable silt loam about 32 inches thick. In places the silt loam is below a depth of 40 inches or is absent.

Included with these soils in mapping, and making up less than 10 percent of the unit, are small areas of Beulah and Canalou soils. Beulah soil is not mottled and is on the higher ridges. Canalou soil is moderately well drained and is on the edge of depressions.

The Dundee soil has moderate permeability, and surface runoff is slow to medium. The available water capacity is high, and the natural fertility is medium.

The Silverdale soil has rapid permeability in the upper part and moderate permeability in the lower part; surface runoff is slow. The available water capacity is moderate, and natural fertility is low to medium.

In both Dundee and Silverdale soils the subsoil is medium acid or strongly acid, but reaction varies widely in the surface layer because of local liming practices. Organic matter content is moderately low. The surface layer is very friable and easily tilled through a wide range of moisture content. After rains the sand particles detach and blow easily.

These soils have good potential for growing cultivated crops, hay, pasture, and trees. They have poor to fair potential for most engineering uses.

Most areas of these soils are used for row crops. These soils are suited to growing wheat, cotton, soybeans, grain sorghum, and grasses and legumes for hay and pasture (fig. 17). Because of wetness in winter and spring, planting may be delayed a few days. In areas where the Silverdale soil has been eroded by wind and is at the lower elevations, runoff water accumulates for a short time. Areas along the St. Francis River or between the river and its levee are subject to flooding.

The area is largely drained by ditches constructed in old natural channels several miles apart. Field ditches generally lack an outlet unless one of the major ditches is close. Landforming generally adds soil to the depressions occupied by Silverdale soil.

This unit is subject to wind erosion unless protected. Field stripcrops, cover crops, and protective amounts of residue on the surface help maintain or increase the content of organic matter, control wind erosion, and increase infiltration. The Silverdale soil, which is droughty during dry periods, is helped by an increased infiltration rate.

There is little use of these soils for pastureland or hayland. Some cover crops are grazed in winter and in spring, but overgrazing results in stand reduction in areas subject to wind erosion. Grazing when the soil is too wet results in compaction and poor tilth. Proper stocking rates and timely delay of grazing are good management practices.

These soils are suited to growing bottom land trees, but only a few areas are in native hardwoods. Tree seedlings and cuttings grow well once established, though unprotected young seedlings can be damaged by blowing sand. Competing vegetation can be controlled by site preparation or spraying. Wetness limits the use of equipment for planting or harvesting, especially in winter and in spring.

These soils are poorly suited to most building site development and onsite waste disposal. The water table and inherent wetness are the major limitations. The Silverdale soil is likely to seep where sewage lagoons are built but not sealed. Dwellings without basements have fair suitability. Where building structures are situated on the Dundee subsoil, sufficient reinforcement should be added to withstand moderate shrinking and swelling. Local roads and streets have good suitability when constructed on the loamy sand surface. Suitable base material generally is available in the upper layers of the Silverdale soil.

Dundee soil is in capability subclass IIw and woodland ordination group 2w. Silverdale soil is in capability subclass IIIs and woodland ordination group 3s.

Fa—Falaya silt loam. This nearly level, somewhat poorly drained soil is on broad flats on former or active flood plains that are parallel to the main streams. Areas of this soil are generally elongated and about 10 to a thousand acres or more.

Typically, the surface layer is dark brown silt loam about 5 inches thick. The next layer is about 5 inches of dark yellowish brown, mottled, friable silt loam. Below this layer is about 10 inches of mottled, grayish brown, friable silt loam. The substratum is light brownish gray and grayish brown, friable silt loam to a depth of 60 inches or more. Where this soil is adjacent to sandy or loamy soil, the substrata below 36 inches are commonly sandy or loamy. In some areas along the St. Francis River, the subsoil is neutral in reaction.

Included with this soil in mapping are small areas of the moderately well drained Collins soil, which is upstream in narrow drains and makes up about 5 to 10 percent of the unit.

Permeability of the Falaya soil is moderate, and surface runoff is slow. Flooding from standing or flowing water occurs for short periods, and the perched water table is then at a depth of about 20 inches.

The surface layer is neutral in places because of local liming practices. Below the surface layer this soil is strongly acid or very strongly acid. Natural fertility is medium, organic matter content is low, and available water capacity is very high. The surface layer is very friable and easily tilled through a fairly wide range of soil moisture. Exposed soil tends to puddle and crust after hard rains.

Most areas of this soil are used for crops. The potential is good for cultivated crops, hay, pasture, and trees and is poor for most engineering uses.

This soil is suited to soybeans, wheat, cotton, corn, and grain sorghum, and to grasses and legumes for hay and pasture; a few areas produce strawberries. Stands of winter annuals and perennial crops are reduced by excess water in winter and spring in some years.

The wetness of this soil is a result of both the water table and the runoff from other areas. Along the St. Francis River, or between the river and its levee, some areas are subject to overflow. A system of field ditches generally removes excess surface water. Landforming enhances drainage, eliminates potholes, and provides suitable grade for supplemental irrigation. Terraces or diversions provide some protection on uplands by diverting runoff from higher positions. Managing crop residue reduces crusting, improves fertility, and maintains organic matter content.

Only a small acreage of this soil is used for hay and pasture. Overgrazing and working or grazing when the soil is wet causes surface compaction and poor tilth. Good management includes proper stocking rates and restricted use during wet periods.

This soil is very well suited to bottom land trees and some native bottom land hardwoods. Most of the area within the St. Francis River levee is woodland. Tree cuttings and seedlings survive and grow well when established; however, once trees attain sufficient size, some tend to topple over or are thrown over by the wind. Harvesting or use of heavy equipment is generally restricted to summer and early fall because of wetness.

Wetness and flooding make this soil poorly suited to building site development and onsite sewage disposal. Dwellings and small buildings need to be designed and constructed to prevent damage from wetness and flooding. Septic tank absorption fields function poorly during wet periods. Sewage lagoons can function where protected from overflow and when sides and floors are properly compacted.

This soil is in capability subclass IIw and woodland ordination group 1w.

Fg—Farrenburg fine sandy loam. This nearly level, *moderately well drained soil is on convex natural levees* or in drainageways surrounded by better drained soils. Areas vary widely in size and shape, but most are elongated and are about 5 to 200 acres or more.

Typically, the surface layer is dark brown fine sandy loam about 6 inches thick. The subsurface layer is about 6 inches of dark brown, friable fine sandy loam. The subsoil is about 40 inches thick. The upper part is dark brown fine sandy loam and yellowish brown loam, is mottled with brown and grayish brown, and is friable. The lower part is light brownish gray, friable loam and is mottled in shades of brown. The substratum is yellowish brown, light brownish gray, and dark brown sand to a depth of 60 inches or more. In places the surface layer is very dark grayish brown. In places the subsoil is thin and depth to the substratum is about 36 inches. In a few areas reaction is slightly acid or neutral throughout the profile.

Included with this soil in mapping are small areas of the well drained Bosket soil and the moderately well drained Canalou soil. The Bosket soil is on higher positions. Canalou soil is in similar positions but has less clay and silt. The included soils make up about 10 percent of the unit.

Permeability of the Farrenburg soil is moderate, and surface runoff is slow. Reaction is very strongly acid to medium acid in the subsoil but is neutral in the surface and subsurface layers because of local liming practices. Natural fertility is medium, organic matter content is moderately low, and the available water capacity is high. The surface layer is very friable and easily tilled through a wide range of moisture content. A weak plow pan often forms at the base of the surface layer, particularly if the soil has been tilled when wet or tilled repeatedly at the same depth. A water table is at a depth of about 2 or 3 feet during wet periods. Areas between the St. Francis River and its levee are subject to overflow.

This soil has good potential for growing cultivated crops, hay, pasture, and trees. It has fair to poor potential for most engineering uses but good potential for area-type landfills.

Most areas of this soil are used for crops. This soil is suited to soybeans, cotton, wheat, corn, grain sorghum, and grasses and legumes for pasture and hay. The subsoil is saturated during wet periods of winter and spring. As a result, the stand of deep rooted perennials is reduced. The surface tends to erode by wind in unprotected areas. Winter cover crops, wind stripcrops, and protective amounts of residue on the surface help control erosion, maintain organic matter content, and increase water infiltration. Areas that are depressional and serve as local drains may be ponded by runoff from adjoining higher landscapes but for only short periods following heavy rains. Excess surface water can ordinarily be removed by field ditches. Restricted use during wet periods helps to prevent surface compaction.

This soil is well suited to growing bottom land trees, but only a few areas are in native woodland. Tree cuttings and seedlings survive and grow well where competing vegetation is controlled by site preparation, pre-

scribed burning, or spraying. This soil has slight hazards or limitations for planting or harvesting.

This soil is fairly to poorly suited to building site development and onsite waste disposal because of wetness of the subsoil. Septic tank absorption fields also function poorly when the subsoil is wet. Where lagoons are installed, it is necessary to seal the reservoir to avoid seepage. Areas on convex slopes that do not accumulate runoff have moderate limitations for buildings without basements. Those areas that accumulate runoff should be protected from overflow and built up with suitable fill material.

Local roads can be improved by the addition of suitable base material. This soil is in capability subclass IIs and woodland ordination group 2o.

Fo—Foley silt loam. This nearly level, poorly drained soil is on broad tops of terraces or natural levees. These areas are high in sodium or in sodium and magnesium, which suppress plant growth. Areas are somewhat elongated and are about 5 to 200 acres or more.

Typically, the surface layer is dark grayish brown silt loam about 7 inches thick. The subsurface layer is about 4 inches of friable, light brownish gray silt loam. The subsoil is about 58 inches thick and is grayish brown and olive gray, firm silty clay loam that has gray and brown mottles. The upper part is strongly acid, and the lower part is moderately alkaline or strongly alkaline and has dark stains. The substratum is light brownish gray silt to a depth of 70 inches or more. In places the surface and subsurface layers are thicker and deeper to sodium layers. In some areas the upper part of the subsoil is brown.

Included with this soil in mapping are small areas of somewhat poorly drained Lafe soil, which occurs as small "slickspots" on higher elevations and makes up less than 10 percent of the unit.

Permeability is very slow, and surface runoff is slow. Reaction is medium acid to very strongly acid in the upper part of the subsoil but ranges to neutral in the surface and subsurface layers because of local liming practices. Available water capacity is moderate, natural fertility is low or medium, and the soil responds to additions of lime and fertilizer. Organic matter content is low. A perched water table is above the subsoil during wet periods. The surface layer is friable and easily tilled. The soil tends to puddle and crust, however, after a hard rain and if it is tilled when wet. Root development is restricted by the layers high in sodium.

The soil has fair potential for growing cultivated crops and hay and pasture and poor potential for trees. It has poor potential for most engineering uses and good potential for sewage lagoons.

Most areas of this soil are used to grow such crops as soybeans, wheat, grain sorghum, cotton, and grasses and legumes for hay and pasture. This soil is best suited to wheat or other crops that grow during the wet winter and spring months. Crops tend to wilt during dry periods. Excessive surface water generally can be removed by a system of surface ditches. Landforming helps to eliminate potholes, but cuts should not be too deep or expose the layers high in sodium. Residue management that provides a protective cover on the surface helps to maintain organic matter content, retard crusting, maintain fertility, and increase water infiltration.

The use of this soil for pasture and hay is limited. Soil layers high in sodium restrict growth of deep rooted pasture and hay crops. Crops die during extended dry periods. The best pasture yield is during the wet, cool months of spring, but grazing when the soil is wet or overgrazing results in surface compaction and poor tilth. Proper stocking rates and restricted use during dry periods are good management practices.

This soil is poorly suited to bottom land trees, but some areas are in woodland. Most woodland is second growth of post oak and hickory species. Species selected should be able to withstand drought because tree cuttings and seedlings often die during dry periods. Once a stand is established the growth is reduced when roots penetrate the layers high in sodium. Planting or harvesting is limited to periods of limited rainfall because of wetness and the perched water table. Surface ditches generally remove excessive surface water except from potholes.

This soil has severe limitations for building site development and sanitary facilities. Septic tank absorption fields function poorly because of the very slow permeability of the subsoil, but sewage lagoons function well. Wetness limits this soil for most engineering uses. The subsoil shrinks and swells with changes in moisture conditions. The shrinking and swelling must be considered in designs for structures that extend to the subsoil. This soil lacks strength for community development and local roads, so bases need to be strengthened by adding suitable material. Steel or other metals used in the subsoil ought to be protected from corrosivity.

This soil is in capability subclass IIw and woodland ordination group 3w.

Ft—Fountain silt loam. This nearly level, poorly drained soil is on flat to slightly convex natural levees and terraces. Areas are irregular and range from about 5 to a thousand acres or more.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsurface layer is mottled, light brownish gray, friable silt loam about 6 inches thick. The subsoil is mottled, grayish brown, firm silty clay loam and silt loam about 36 inches thick. The substratum is grayish brown silt loam to a depth of 60 inches or more. In places the surface layer and subsurface layer are thicker, and depth to the subsoil is as much as 20 inches. In some areas, mostly in depressions or old channels, the subsurface layer is more acid.

Included with this soil in mapping are small areas of Calhoun soil in shallow drains and depressions. This included soil makes up 5 to 10 percent of the unit.

Permeability of the Fountain soil is moderately slow, and surface runoff is slow. Reaction of the subsoil is neutral to moderately alkaline, but the surface layer is strongly acid to neutral because of local liming and irrigation practices. Natural fertility is medium or high, and organic matter content is moderately low. The available water capacity is very high. The surface layer is friable and easily tilled but tends to puddle and crust if worked when wet. A water table is within 18 inches of the surface during wet periods.

This soil has good potential for cultivated crops, hay, pasture, and trees where it is drained. It has poor potential for most engineering uses.

Most areas are farmed. This soil is suited to soybeans, corn, cotton, grain sorghum, wheat, grasses and legumes, and hay and pasture. Surface ditches generally remove most excess surface water, but potholes remain wet for longer periods. Managing crop residue to leave a protective cover on the surface and incorporating the rest in the soil helps maintain or improve fertility, reduce crusting, and also helps maintain organic matter content. Some local ponding occurs in low areas and causes reduction in stand, particularly in wheat. Large areas of this soil have been graded to eliminate potholes and enhance surface drainage, and much of this area is used for supplemental irrigation.

The use of this soil for pasture and hayland is somewhat restricted, since most areas are cultivated. Overgrazing or grazing when the soil is too wet causes surface compaction and poor tilth. Proper stocking rates and restricted use during wet periods help maintain pasture and soil in good condition. In places deep rooted perennials have some stand reduction because of wetness and potholes.

This soil is well suited to bottom land trees, but only a few areas remain in native hardwoods. Tree cuttings and seedlings grow well once established. The first year or so seedlings have some difficulty surviving the wetness. The period for harvesting trees is limited because of the inherent wetness and the water table, but field ditches can generally remove excess surface water.

Fountain soils are poorly suited for building site development and onsite waste disposal because the moderately slow permeability and water table result in too much wetness. Septic tank absorption fields function poorly because of the moderately slow permeability and water table. Local areas accumulate runoff and are ponded which would further interfere with building site development. Sewage lagoons can function where the reservoir is properly compacted to prevent seepage. The shrink-swell potential of the subsoil needs to be considered when buildings are to be constructed on this soil. Surface drainage can be provided by proper grading of the site.

The soil is in capability subclass IIIw and woodland ordination group 2w.

Gd—Gideon loam. This nearly level, poorly drained soil is in basins, in drains, and on low natural levees. This soil is surrounded or flanked by higher loamy or sandy natural levees. Areas are elongated and generally oriented in a southwesterly direction. They are about 5 to 300 acres or more.

Typically, the surface layer is very dark grayish brown loam about 8 inches thick. Below this is about 61 inches of dark gray and gray loam and clay loam mottled with gray and brown. The clay loam part is firm and the loam is friable. The substratum is loamy sand and in places is within a depth of 48 inches. In places these soils have a surface layer of sandy loam or clay loam.

Included with this soil in mapping are areas of the poorly drained Sharkey and Wardell soils. Sharkey soil is in lower positions and has more clay. Wardell soil is in positions similar to Gideon soil, but is acid. The included soils make up about 5 to 10 percent of the unit.

Permeability is moderately slow in this soil. Runoff is slow, and the soil receives water from higher positions. Reaction is slightly acid to mildly alkaline. Natural fertility is high, organic matter content is moderately low, and available water capacity is high. This soil has a water table as high as one foot below the surface during wet winter and spring months. The surface layer is friable and easily tilled, but if it is tilled when wet, it tends to puddle and crust. Flooding is a seasonal occurrence in areas between the St. Francis River and its levees.

This soil has good potential for growing cultivated crops, hay, pasture, and trees. It is a little wet for most engineering uses.

Most areas are used for crops. The soil is suited to soybeans, cotton, corn, grain sorghum, small grains, grasses and legumes for pasture and hay, and other summer annuals. Wheat and winter annuals often have some stand reduction because of flooding or ponding in winter and in spring. Wetness is the main management concern, but landforming or a system of field ditches generally remove excess surface water. In addition, proper landforming provides a suitable grade for supplemental irrigation. This soil commonly develops a plow sole or plow pan where it is plowed wet or is plowed consistently at the same depth. Managing crop residue to provide a protective cover and returning the remainder to the soil help reduce crusting, improve fertility, maintain organic matter content, reduce erosion, and increase infiltration.

Only a small acreage of this soil is used for pasture and hay, since most of this soil is cultivated. Areas used for pasture compact when overgrazed or if grazed when wet. Proper stocking rates, pasture rotation, and restricted use when the soil is wet are good management practices.

This soil is well suited to bottom land trees, but only a few areas are in native hardwoods. The natural wetness of this soil tends to limit the establishment of stands, but surface drainage and selection of suited species help overcome this hazard. After establishment, trees and seedlings survive and grow well if competing vegetation is controlled by site preparation, prescribed burning, or spraying. Harvesting generally must be delayed to take advantage of dry periods.

This soil is too wet for building site development and onsite waste disposal. Areas with artificial drainage have less severe limitations. Because of the water table, dwellings and small buildings ought to be constructed without basements, or designed to overcome the problem of wetness. If foundations extend into the subsoil, they should be designed to withstand moderate shrinking and swelling of the soil.

Septic tank absorption fields fail to function properly when the water table rises above the filter field. Sewage lagoons are probably the best solution to waste disposal. Factors to be considered in design and construction are depth to sandy layers and need for compaction.

This soil is in capability subclass IIw and woodland ordination group 2w.

Jp—Jackport silty clay loam. This nearly level, poorly drained soil is in slightly concave depressions and drainageways. Most areas are surrounded by slightly higher, slightly convex soils. Areas are generally elongated in a northern to southern direction. They are about 20 to 400 acres or more.

Typically, the surface layer is dark grayish brown silty clay loam about 9 inches thick. The subsoil is about 56 inches thick; the upper part is grayish brown, firm silty clay and clay, and the lower part is olive gray, firm silty clay loam. The substratum is grayish brown, friable silt loam to a depth of more than 70 inches. In places the acid subsoil is thinner, and neutral to alkaline layers are at a depth of 48 inches. Some of the wetter areas have a silty clay surface layer.

Included with this soil in mapping are small areas of the somewhat poorly drained Crowley soil, which makes up less than 5 percent of the unit. This included soil is on slightly concave ridges.

Permeability of this soil is very slow, and surface runoff is slow. Reaction is very strongly acid to strongly acid in the subsoil but is often medium acid or slightly acid in the surface layer because of local liming practices. Natural fertility is medium, organic matter content is moderately low, and available water capacity is moderate. The surface layer is firm and can be tilled favorably through a fairly narrow moisture range. The soil needs to be tilled early so that rain, freezing and thawing, and alternate wetting or drying can help break up clods into aggregates suitable for a seedbed. The soil becomes hard and cloddy if tilled when wet. After heavy rains it often puddles and crusts. A water table perches above the clayey subsoil during wet periods, and the water is ponded in potholes and depressions after heavy rains.

This soil has good potential for growing cultivated crops, hay, pasture, and bottom land trees where drained. It has poor potential for most engineering uses, but good potential for sewage lagoons.

Most areas of this soil are used for row crops. This soil is suited to soybeans, grain sorghum, and grasses for pasture and hay. It is generally a little wet for cotton and corn. Wheat is often reduced in stand because of standing water. Wetness is the main management concern on this soil though field ditches generally remove excess surface water. Landforming enhances drainage, eliminates potholes, and provides a suitable grade for supplemental irrigation. This soil is very slowly permeable and water ponds in low places during wet periods. The subsoil, and in most places the surface layer, shrink and swell with changes in moisture content. This soil holds large amounts of water but only part is available to plants. Areas along the St. Francis River and its levees are subject to overflow.

Residue management that leaves a protective cover on this surface and incorporates the rest in the soil helps maintain soil tilth. The use of this soil for pastureland or hayland is limited since most of this soil is used for cultivated crops. Perennial stands often are reduced because of wetness and local ponding, unless they are drained. Grazing when the soil is wet results in poor tilth. Timely delay of grazing during wet periods is a vital practice to maintain pasture and soil in good condition.

This soil is well suited to growing bottom land trees, and some areas are in hardwoods. The wetness and ponding of water cause some seedling mortality, but field ditches generally remove most excess surface water. Tree cuttings and seedlings grow well once established. Harvesting needs to be planned to take advantage of dry periods.

This soil is poorly suited to building site development. The wetness, amount of clay, and shrink-swell potential are the main limitations. The design and construction of any buildings on this soil should take these factors into consideration. Because of the very slow permeability, shrink-swell, and wetness, this soil is poorly suited to septic tank absorption fields. Sewage lagoons can function when constructed in the clayey subsoil. Local roads can generally be improved by the addition of suitable base material.

This soil is in capability subclass IIIw and woodland ordination group 2w.

Lf—Lafe silt loam. This nearly level, somewhat poorly drained soil is on slightly convex or flat terraces, or outcrops on short side slopes. Areas are somewhat irregular and are about 5 to 50 acres.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The alkaline subsoil is about 37 inches thick; the upper part is yellowish brown and

brown, firm silty clay loam mottled with shades of gray and brown, and the lower part is grayish brown, firm silty clay loam mottled in shades of brown. The substratum is grayish brown silt loam to a depth of 60 inches or more. In places the surface layer is thicker and deeper to alkaline or sodium-affected layers. The subsoil is at or near the surface in some small spots.

Included with this soil in mapping are small areas of the poorly drained Foley soil. This included soil is in the more depressional areas that generally accumulate runoff from the Lafe soil. Foley soil makes up about 10 percent of the unit.

Permeability of the Lafe soil is very slow. The content of sodium in the subsoil causes the soil particles to disperse, and in turn reduces permeability. Surface runoff is slow. A perched water table is above the dispersed subsoil during wet periods. Reaction of the subsoil is moderately alkaline to strongly alkaline, but varies widely. It is strongly acid to mildly alkaline in the surface layer because of mixing with the subsoil and because of local liming practices. Natural fertility is low, and the high pH reduces the availability of some nutrients. The organic matter content and available water capacity are low. The surface layer is friable but tills easily only through a narrow moisture range. After hard rains it puddles and crusts. Root development is restricted in the highly alkaline and dispersed layers.

This soil has poor potential for cultivated crops, summer annuals, hay, pasture, and trees. It is poorly suited to fairly suited for most engineering uses except sewage lagoons.

Most areas of this soil are used for row crops. These areas seldom are in large enough tracts to be managed separately, so they are farmed like adjacent soils. Soybeans and grain sorghum are the most widely grown summer annuals. Cool season annuals such as wheat, which grows during the cool, wet part of the year, are well suited. Crops often wilt and die during summer months. Most areas do not produce crops at economical levels. Cuts in landforming generally remove the most favorable soil and leave the highly alkaline layers at or near the surface. Surface ditches generally are the best solution to wetness. Managing crop residue to leave a protective cover on the surface and incorporate the rest in the surface helps to reduce crusting and increase infiltration.

The use of this soil for pastureland or hayland is limited, since most of it is cultivated. Grasses and plants with fibrous root systems generally survive better than deep rooted plants. Most pasture plants wilt and some die during the summer. Grazing when the soil is wet causes compaction and reduces infiltration. Timely delay of grazing and restricted use during wet periods are good pasture management practices.

This soil is poorly suited to growing trees because of the highly alkaline subsoil. The few areas remaining in scrub woodland are mostly black oak and blackjack oak. Tree cuttings and seedlings do not survive well, and a few can be expected to die each year.

Lafe soil has severe limitations for building site development and septic tank absorption fields. Sewage lagoons generally hold water and seal well in this soil. However, the soil is too wet for most building sites, and foundations should be designed to consider the moderate shrink-swell potential in the subsoil. In addition, this soil is highly corrosive to steel. It lacks strength for local roads, but the addition of suitable base material helps overcome the low strength.

This soil is in capability subclass IVs and has not been assigned to a woodland ordination group.

Ln—Lilbourn fine sandy loam. This nearly level, somewhat poorly drained soil is on low ridges, terraces, and in slightly concave drains. Areas are irregular and are about 5 to several hundred acres.

Typically, the surface layer is dark grayish brown fine sandy loam about 7 inches thick and mottled, brown, friable fine sandy loam about 8 inches thick. The next layer is loose grayish brown, mottled loamy sand about 11 inches thick. A buried horizon is about 26 inches below the surface, the upper 3 inches is gray, mottled, friable sandy loam. Under this is mottled, dark gray, firm sandy clay loam about 9 inches thick, and the rest is mottled, dark gray, friable sandy loam about 11 inches thick. The substratum is gray and brown loamy fine sand and sand to a depth of 60 inches or more. Some areas do not have the buried loamy layers. Some pedons have browner substrata.

Included with this soil in mapping are small areas of moderately well drained Canalou soil and poorly drained Gideon soil. The Canalou soil is on slightly higher elevations, and the Gideon soil is in lower areas. The included soils make up about 8 to 10 percent of the unit.

Permeability is moderate, and surface runoff is slow. The reaction normally is acid, but it is mildly alkaline in the upper part because of local liming practices. In places reaction is neutral in the substratum because of local liming or irrigation practices. Natural fertility is low to medium, and available water capacity is moderate. This soil has a water table at a depth of about 12 to 24 inches during wet periods. Flooding from runoff occurs in some places, and areas between the St. Francis River and its levee are subject to overflow. Organic matter content is moderately low, and the surface layer is friable and easily tilled through a fairly wide moisture range.

This soil has good potential for hay and pasture, and fair to good potential for cultivated crops and trees. It has poor potential for most engineering uses.

Most areas of this soil are used for crops. This soil is suited to soybeans, cotton, corn, wheat, grain sorghum, grasses, and hay crops. Small grain and other cool season crops are subject to some stand reduction because of wetness, which is the major hazard in most uses of this soil. A system of drainage ditches, with

landforming, helps eliminate standing surface water. Residue management that provides a protective cover and incorporates the rest in the soil helps to maintain good tilth and the content of organic matter.

When this soil is used for pasture, surface compaction and poor tilth may result from overgrazing and grazing when wet. Pasture rotation, proper stocking rates, and restricted use during wet periods are good management practices.

This soil is moderately well suited to growing bottom land trees. Tree seedlings and cuttings survive and grow well when competing vegetation is controlled by site preparation and when drainage is provided. Proper selection of harvesting time is important to avoid wetness that limits the operations of harvesting equipment.

This soil is poorly suited to building site development and sanitary and sewage facilities because of wetness and flooding hazards. It is suitable for road and street construction if protected from flooding and excess wetness. Artificial drainage can be used to remove excess surface water. This soil is a good source for landfill cover and topsoil.

This soil is in capability subclass IIw and woodland ordination group 3o.

LoB—Loring silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on slightly convex ridgetops and narrow side slopes. It generally is at lower elevations on the uplands. Areas are somewhat narrow and elongated. The ridgetops are "branched out" and have a trellis-like appearance on the map. Areas of this soil are 5 to 100 acres or more.

Typically, the surface layer is dark brown silt loam about 7 inches thick. The subsoil is about 47 inches thick. The upper 15 inches is friable, dark brown silt loam and firm, strong brown silty clay loam; the middle 7 inches is firm, slightly brittle, yellowish brown silty clay loam, mottled in shades of gray and brown; and the lower part is very firm, dark yellowish brown silty clay loam and dark brown, slightly firm silt loam. The substratum is mottled, dark brown silt loam to a depth of 60 inches or more. In eroded areas the surface layer is thinner and has more clay because it has mixed with the subsoil. Some areas have more than 5 percent slopes and are along narrow side slopes.

This soil has moderate permeability in its upper layers and moderately slow permeability in the fragipan. Surface runoff from cultivated areas is medium. Reaction is medium acid to very strongly acid in the subsoil, but it is slightly acid or neutral in the surface layer because of local liming practices. Natural fertility is low to medium, but this soil responds well to the addition of fertilizer and lime. Organic matter content is low or moderately low, and available water capacity is moderate. The surface layer is easily tilled through a wide range of moisture conditions, but it tends to compact and crust if tilled when moist. Root development is mostly restricted to soil above the fragipan, where the water table perches during wet winter and spring months.

This soil has fair potential for trees. It has fair to good potential for most engineering uses.

Most areas of this soil are used for crops, but many areas are in pasture, hay, or orchards. This soil is suited to soybeans, wheat, cotton, grain sorghum, peas, legumes, and grasses for hay or pasture, and to trees. It is also well suited to orchard crops because its position provides good air drainage. If the soil is used for orchards or cultivated crops, there is a hazard of erosion. Minimum tillage, no-till, winter cover crops, and contour farming help to prevent excessive soil loss (fig. 18). Residue management that provides protective cover on the surface improves fertility, reduces compaction and crusting, and helps maintain organic matter content. Planting new trees on the contour also helps. Water for spraying or irrigation can be obtained from ponds or lakes nearby.

Using this soil for pasture and hay is an effective measure in controlling erosion, but overgrazing or grazing when wet results in compaction, excessive runoff, and poor tilth. Proper stocking rates, pasture rotation, and restricted use when the soil is wet are good management practices.

This soil is moderately well suited to growing upland trees, although only a few areas are in woodland. Seedlings and cuttings survive and grow well if competitive vegetation is controlled or removed by site preparation, spraying, or prescribed burning. This soil has no particular hazards or limitations for planting or harvesting trees.

This soil is fairly well suited to building site development and onsite waste disposal. Septic tank absorption fields function poorly if installed in or above the fragipan, but can be improved if installed below. Dwellings with basements should be designed to prevent damage from water, which requires such treatment as wall seal or drainage tile. Lack of strength in the soil means that building foundations generally need more reinforcement. The soil lacks sufficient strength for local roads, but this can be improved by the addition of suitable base material.

This soil is in capability subclass IIe and woodland ordination group 3o.

LoC—Loring silt loam, 5 to 9 percent slopes. This sloping, moderately well drained soil is mainly on convex ridgetops. Some areas are on short side slopes. Areas are long and narrow. The ridgetops are "branched out" and have a trellis-like appearance on the map. Areas are about 15 to 200 acres or more.

Typically, the surface layer is dark brown silt loam about 7 inches thick. The subsoil is about 47 inches thick. The upper 15 inches is friable, dark brown silt loam and strong brown silty clay loam; the middle 7 inches is very firm, brittle, yellowish brown silty clay loam and has mottles in shades of gray and brown; the lower part is

firm, dark brown silty clay loam and dark brown silt loam. The substratum is mottled, dark brown silt loam to a depth of 60 inches or more. In eroded areas the surface layer is thinner and has more clay because it has mixed with the subsoil. Some areas on narrow ridgetops are gently sloping.

This soil has moderate permeability in its upper layers and moderately slow permeability in the fragipan. Surface runoff from cultivated areas is medium. Reaction is medium acid to very strongly acid in the subsoil, but in places is neutral in the surface layer because of local liming practices. Natural fertility is low to medium, but this soil responds well to the addition of fertilizer and lime. Organic matter content is low or moderately low, and available water capacity is moderate. The surface layer is easily tilled through a wide range of moisture conditions but compacts, puddles, and forms a crust if tilled when wet. Root development is somewhat restricted by the dense fragipan. A perched water table is above the fragipan during wet winter and spring months.

This soil has fair potential for trees. It has fair to good potential for most engineering uses.

Most areas of this soil are used for orchards, pasture, and crops. This soil is suited to soybeans, wheat, cotton, grain sorghum, peas, trees, and legumes and grasses for hay or pasture. It is well suited to orchards because its position on the landscape provides air drainage favorable to peaches and other orchard crops. When this soil is used for orchards or cultivated crops, there is a hazard of erosion. Terraces, grassed waterways, minimum tillage, winter cover crops, and contour farming help control erosion. Residue management that provides protective cover on the surface helps maintain or improve organic matter content and soil tilth. Planting new trees on the contour helps to control runoff. Water for spraying or irrigation can be obtained from nearby ponds or lakes.

The use of this soil for pasture and hay is very effective in controlling erosion. Overgrazing or grazing when the soil is wet results in compaction, excessive runoff, and poor tilth. Proper stocking rates, pasture rotation, and restricted use during wet periods are essential to good management.

This soil is moderately well suited to upland trees, though only a few areas are in woodland. Seedlings and cuttings survive and grow well if competitive vegetation is controlled or removed by site preparation, spraying, or prescribed burning. This soil has no particular hazards or limitations for planting or harvesting trees.

This soil is fairly well suited for building site development and onsite waste disposal. However, slope requires some special consideration in sewage lagoon construction. Septic tank absorption fields function poorly if installed in or above the fragipan, but can be improved by installing beneath the fragipan. The absorption field can be increased in size to overcome the moderately slow permeability. The insufficient soil strength can be overcome by adding suitable base materials in road construction and extra reinforcement in building foundations. Designs of dwellings with basements need to take into account the perched water table and provide necessary seal and drainage. Sand and gravel are mined from deposits underlying this soil.

This soil is in capability subclass IIIe and woodland ordination group 3o.

LoD2—Loring silt loam, 9 to 14 percent slopes, eroded. This strongly sloping, moderately well drained soil is on side slopes adjacent to ridgetops. Areas are elongated, narrow, and parallel to the ridgetops. Areas are about 40 to 500 acres or more.

Typically, the surface layer is dark brown silt loam about 5 inches thick. The subsoil is about 40 inches thick. The upper 7 inches is friable, dark brown silt loam and strong brown silty clay loam; the middle is about 8 inches of firm, yellowish brown silty clay loam and is brittle and has mottles in shades of gray and brown; the lower part is very firm, dark yellowish brown silty clay loam and dark brown silt loam. The substratum is mottled, dark brown silt loam to a depth of 60 inches or more. Some areas have small rills and gullies and a surface layer of silty clay loam. In eroded areas the surface layer is thinner and has more clay because it is mixed with the subsoil. The restrictive layer is closer to the surface than is normal for the Loring soils because of erosion, but this difference does not alter the usefulness or behavior of the soil.

Included with this soil in mapping are areas of the well drained Memphis soils. The included soil makes up about 10 percent of the unit.

This soil has moderate permeability in the upper layer and moderately slow permeability in the fragipan. Surface runoff from cultivated areas is rapid. Reaction is medium acid to very strongly acid in the subsoil, but in many places in the surface layer it is neutral because of local liming practices. Natural fertility is low to medium, but the soil responds well to the addition of fertilizer and lime. Organic matter content is low, and available water capacity is moderate. The surface layer is easily tilled through a wide range of moisture conditions. Where not eroded, the surface layer contains more silt and is less difficult to till and prepare as seedbeds. Some areas have rills and gullies deep enough to interfere with the operation of machinery. The surface layer tends to compact, puddle, and form a crust if worked when moist. Root development is somewhat restricted in and below the fragipan. A perched water is above the fragipan during wet winter and spring months.

This soil has fair potential for trees. It has fair to good potential for most engineering uses.

Most areas are farmed, but many areas are in pasture and hay, orchards, or woodland. This soil is suited to soybeans, wheat, cotton, grain sorghum, peas, trees, orchards, legumes, and grasses for hay or pasture. Its position on the landscape provides air drainage favora-

ble to peaches and other orchard crops, though if used for orchards or cultivated crops there is a hazard of further erosion and sedimentation. On unprotected areas, rills as much as a foot deep form after the last plowing in summer. Terraces, grassed waterways, minimum tillage, no-till, winter cover crops, and contour farming help prevent excessive soil loss. Residue management that provides protective cover helps improve fertility, reduces compaction and crusting, and helps to maintain organic matter content. Mechanical practices are needed in some eroded areas to prevent further erosion. Planting new trees on the contour is effective in managing runoff. Water for spraying or irrigation can be obtained from nearby ponds or lakes.

Use of this soil for pasture and hay is very effective for controlling erosion. Overgrazing or grazing when the soil is wet results in compaction, excessive runoff, and poor tilth. Proper stocking rates, pasture rotation, and restricted use during wet periods are good management practices.

This soil is moderately well suited to upland trees, though only a few areas are in woodland. Seedlings and cuttings survive and grow well if competing vegetation is controlled or removed by site preparation, spraying, or prescribed burning. This soil has no particular hazards or limitations to planting or harvesting trees.

This Loring soil is fairly well suited for building site development and onsite waste disposal, but excessive slope presents some problems in sewage lagoon construction. Septic tank absorption fields function poorly if installed in or above the fragipan, but can be improved by installing below it. The size of the absorption field can be increased to overcome the moderately slow permeability. Because of slope, special design and installation practices are needed to insure proper loading of lateral sewage lines. Addition of suitable base materials in road construction and extra reinforcement for building foundations are needed to overcome insufficient soil strength. Slope presents some building problems, but requires only more foundation. The design for dwellings with basements should take into account the perched water table and provide necessary seal and drainage.

Sands and gravel are mined from areas underlying this soil.

This soil is in capability subclass IVe and woodland ordination group 3o.

Ma—Malden fine sand, 0 to 4 percent slopes. This nearly level to gently undulating, excessively drained soil is on broad convex sandy natural levees. Areas are somewhat irregular, generally oriented in a north-south direction, and are about 5 to several thousand acres.

Typically, the surface layer is dark brown fine sand and loamy fine sand about 10 inches thick. The subsoil is about 40 inches of dark brown and dark yellowish brown, very friable loamy fine sand and fine sand. The underlying material is yellowish brown sand to a depth of 60 inches or more. In places the underlying material is fine sandy loam, either as one layer or as thin alternating bands. In a few areas along toe slopes of ridges there are mottles below a depth of 48 inches.

Included with this soil in mapping are small areas of the well drained and somewhat excessively drained Broseley soil and the moderately well drained Canalou soil. Broseley soil is on narrow ridgetops, and Canalou soil is on lower elevations. The included soils make up about 10 percent of the unit.

Permeability of this soil is rapid, and surface runoff is slow, since most precipitation is absorbed into the sandy surface. Reaction is strongly acid to slightly acid, but is neutral in places because of local liming and irrigation practices. Inherent fertility is low or medium, but these soils respond well to the addition of fertilizer and lime. Available water capacity is low, and organic matter content is low or moderately low. The surface layer is very friable and tends to be loose when dry, but it is easily tilled through a wide range of moisture conditions.

This soil has good potential for growing cultivated crops, pasture and hay, and such special crops as watermelons and cantaloupes. It has fair potential for trees.

Most areas of this soil are used for crops, and double cropping with wheat followed by soybeans, peas, or grain sorghum is common. This soil is suited to cotton, soybeans, corn, peas, small grains, grasses and legumes for pasture and hay, watermelons, and cantaloupes. There is a hazard of wind erosion on cultivated soils. Most damage is to young tender plants by the moving sand particles. Winter cover crops, pasture and hay, wind stripcrops, and field windbreaks help control wind erosion. This soil tends to be droughty during extended dry periods, and areas that have been graded need to be supplementally irrigated at these times. Other areas are irrigated by sprinkler systems (fig. 19). Most of the corn is irrigated. Places between the St. Francis River and its levee are subject to overflow, but areas of the soil on higher elevations are less susceptible to flooding. Many of the watermelons and cantaloupes of the county are grown on this soil. Residue management provides surface protection and also reduces soil blowing and improves fertility. Although the use of this soil for pasture and hay is limited, it is an effective method in controlling erosion.

Overgrazing or grazing during extended dry periods often results in reduction of the stand. Proper stocking rates, pasture rotation, timely delay of grazing, or irrigation are practices necessary to keep the pasture in good condition.

This soil is moderately well suited to growing bottom land trees, but few areas are in woodland. Tree seedlings and cuttings grow well once established, though seedling mortality is likely in extended dry periods or where erosion is not controlled by cover crops and wind stripcrops. There are no particular equipment limitations when planting or harvesting.

This soil is suitable for community development but is too sandy for most onsite waste disposal. Septic tank absorption fields pollute underground water in places. Excessive seepage from sewage lagoons can be prevented by sealing the lagoon.

This soil is in capability subclass IIIs and woodland ordination group 3s.

MeC—Memphis silt loam, 5 to 9 percent slopes. This sloping, well drained soil is on convex ridgetops of the uplands. Areas are long and narrow and are about 10 to 100 acres or more.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil is about 54 inches thick; the upper part is friable, yellowish brown silt loam, and the lower part is dark brown and dark yellowish brown silty clay loam. The substratum is yellowish brown silt loam to a depth of about 72 inches. In places the surface layer has eroded, and depth to the subsoil is shallower. In some places the surface layer and subsoil have been mixed by plowing, and the surface layer is browner.

Included with this soil in mapping are small areas of the moderately well drained Loring soil. This included soil is in flat areas of saddles between knobs of Memphis soils. Loring soil makes up about 5 percent of the unit.

Permeability of this soil is moderate, and surface runoff is medium. Reaction ranges from medium acid to very strongly acid in the subsoil but is often higher in the surface layer because of local liming practices. Natural fertility is medium, and the soil responds well to the addition of fertilizer and lime. The available water capacity is high or very high. Organic matter content is moderately low. The surface layer is friable and easily tilled through a wide moisture range. It tends to compact, puddle, and form a crust if worked when wet.

This soil has good potential for cultivated crops, hay, pasture, orchards, and trees. It has fair to good potential for most engineering uses.

Most areas of this soil are used for pasture, cropland, and orchards. This soil is suited to orchards, soybeans, wheat, cotton, grain sorghum, and grasses and legumes for hay and pasture. Its location and position on the landscape allows desirable air drainage for orchards (fig. 20), however, where used for cultivated crops or orchards there is a hazard of erosion. Terraces, no-till, minimum tillage, cover crops, and grassed waterways help prevent excessive soil loss. Residue management that provides protective cover on the surface helps maintain or improve fertility, reduce compaction and crusting, and aids water infiltration. Water for spraying is easily provided by ponds or lakes in this soil and adjacent soils.

An effective method of controlling erosion is the use of this soil for pasture and hay. Overgrazing, grazing when the soil is wet, or using equipment when the soil is wet results in surface compaction, excessive runoff, and poor tilth. Proper stocking rates and restricted use during wet periods are necessary practices to maintain the soil and pasture in good condition. Water for livestock is easily provided by ponds that have been constructed.

This soil is well suited to growing upland trees, though only a few areas are in woodland. Tree seedlings and cuttings survive and grow well where competing vegetation is controlled by site preparation, spraying, cutting, or girdling. There are no hazards or limitations to planting or harvesting trees on this soil.

This soil is suitable for building site development and for onsite waste disposal. It lacks strength, so building foundations generally need some reinforcement. Local roads can be strengthened by adding suitable base material. Potential seepage and slope should be considered when installing sewage lagoons. Sand and gravel are mined from deposits underlying this soil.

This soil is in capability subclass IIIe and woodland ordination group 2o.

MeD—Memphis silt loam, 9 to 14 percent slopes. This strongly sloping, well drained soil is on side slopes of the uplands. Areas are long and narrow and parallel the ridgetop. They are about 40 to 300 acres or more.

Typically, the surface layer is dark brown silt loam about 5 inches thick. The subsoil is about 33 inches thick. The upper part is friable, dark yellowish brown silt loam. The lower part is dark brown, firm silty clay loam. The substratum is dark brown silt loam to a depth of 60 inches or more. In places the surface layer has eroded and depth to the subsoil is less. Also, in some places the surface layer and subsoil have been mixed by plowing so the surface layer is browner and has more clay. Eroded areas have a silty clay loam surface layer and are dissected by small rills.

Included with this soil in mapping are some areas with pockets of sand and gravel. These included areas are along the eastern toe slope of Crowleys Ridge and make up less than 5 percent of the unit.

Permeability of this soil is moderate, and surface runoff is medium or rapid. Reaction is medium acid to very strongly acid in the subsoil but varies widely. Generally reaction is higher in the surface layer because of local liming practices. Natural fertility is medium, and the soil responds well to the addition of fertilizer and lime. The available water capacity is high or very high. Organic matter content is moderately low. The surface layer is friable and easily tilled through a wide moisture range. This soil, especially the eroded spots, will puddle and form a crust if tilled when wet.

This soil has good potential for growing cultivated crops, hay, pasture, orchards, and trees. It has fair to good potential for most engineering uses.

Most areas of this soil are used for pasture, cropland, and orchards. This soil is suited to soybeans, wheat, cotton, grain sorghum, and grasses and legumes for hay and pasture and also to such orchard crops as peaches, nectarines, and apples. The location and position of the

soil on the landscape allows desirable air drainage. Areas that are in orchards or cultivated crops erode if the surface is left unprotected. No-till, minimum tillage, cover crops, terraces, and grassed waterways help prevent excessive soil loss, but most areas are too irregular for efficient use of parallel terraces. Managing crop residue to maintain a protective cover and incorporating the rest into the soil help improve fertility, reduce compaction and crusting, and aid infiltration.

The use of this soil for pasture and hay is an effective method of controlling erosion. Overgrazing or grazing while the soil is wet causes surface compaction, excessive runoff, and poor tilth; and using equipment when the soil is wet has the same effect. Proper stocking rates and restricted use during wet periods are necessary to maintain the soil and pasture in good condition. Water for livestock is easily provided by ponds.

This soil is well suited to growing upland trees, though only a few areas remain in woodland. Tree cuttings and seedlings survive and grow well where competing vegetation is controlled by site preparation, spraying, cutting, or girdling. This soil has no hazards or limitations to planting or harvesting trees.

This soil is suitable for building site development and for onsite waste disposal, but building foundations generally need some reinforcement because the soil lacks strength. Local roads can be strengthened by adding suitable base material. Potential seepage and slope should be considered when installing sewage lagoons. Because of slope, special design and installation procedures are needed to insure proper loading of lateral sewage lines.

Coastal Plains sand and gravel are mined from deposits underlying this soil.

This soil is in capability subclass IVe and woodland ordination group 2o.

MeE2—Memphis silt loam, 14 to 30 percent slopes, eroded. This moderately steep, well drained soil is on side slopes of the uplands, particularly along the eastern slope of Crowleys Ridge. Areas are long and narrow and parallel the ridgetops. They are about 40 to 200 acres or more.

Typically, the surface layer is dark brown silt loam about 4 inches thick. The subsoil is about 40 inches of dark brown and dark yellowish brown silt loam and firm silty clay loam. The substratum is yellowish brown silt loam to a depth of 60 inches or more. Since the surface has eroded, depth to the subsoil is less. Some areas that have a silty clay loam surface layer are dissected by small rills and gullies.

Included with this soil in mapping are areas with pockets of gravel and sand and small areas of Orthents, steep. These included areas are along the eastern side slope of Crowleys Ridge and make up less than 5 percent of the unit.

Permeability of this soil is moderate and surface runoff is rapid. Reaction is medium acid to very strongly acid in the subsoil, but a few areas are neutral in the surface layer as a result of local liming practices. Natural fertility is medium, and this soil responds well to the addition of fertilizer and lime. The available water capacity is high, and organic matter content is moderately low because of erosion. The less eroded areas are fairly easily tilled through a wide moisture range. However, the more eroded areas that have more clay in the surface layer form clods when tilled dry or puddle and form a crust when tilled wet.

This soil has good potential for hay, pasture, orchards, and trees. It has poor to fair potential for most engineering uses.

Most areas of this soil are used for pasture, woodland, or orchards. The soil is generally too steep for cropland because rills and gullies develop in areas that are cultivated.

The use of this soil for pasture and hay is an effective method of controlling erosion. However, overgrazing or grazing while the soil is wet causes surface compaction, excessive runoff, erosion, and poor tilth. Diversions and grassed waterways are effective in controlling runoff. Proper stocking rates and restricted use during wet periods help to keep the soil and pasture in good condition. Water for livestock is easily provided by ponds.

This soil is also used for such orchard crops as peaches, nectarines, and apples. The location of the soil on the landscape allows desirable air drainage. Areas in orchards erode unless a protective cover is maintained. Winter cover crops, management of residue on the surface, and planting on the contour are effective erosion control practices. Grassed waterways help to control erosion where runoff has accumulated in channels. Water for spraying is accessible from ponds or lakes in this and adjacent soil.

This soil is well suited to upland trees, and some areas are in woodland. The use of this soil for woodland is effective in controlling erosion. Tree seeds, cuttings, and seedlings survive and grow well where competitive vegetation is controlled by site preparation, spraying, cutting, or girdling. Because of slope, moderate erosion hazards and equipment limitations need to be considered in planting and harvesting operations.

Slope is the major limitation for building site development and for onsite waste disposal. The soil lacks strength, so building foundations generally need some reinforcement. Roads can be strengthed by adding suitable base material. Potential seepage and the slope need to be considered when installing sewage lagoons.

Coastal Plains sand and gravel are mined from areas underlying this soil.

This soil is in capability subclass VIe and woodland ordination group 2r.

Or—Orthents-Water complex. This map unit consists of the Little River Drainage System ditches and the adjacent berms. Soils in the berms are gently sloping to strongly sloping on the tops, and steep on the side slopes. The area is typified by long, narrow areas of water in the ditches separated by long, narrow areas of loamy and clayey soils. The area is one delineation of about 4,000 acres, of which about 1/3 is water (fig. 21).

Growth on the soil in this unit includes native species of grasses, shrubs, and trees. Materials that were dug from the ditches range in texture from sand to clay.

Included with this complex in mapping are small areas of the poorly drained Gideon and Sharkey soils. The inclusions are on the undisturbed areas between spoils.

Most of the area is drained by the adjacent ditches. However, most of this unit is also subject to overflow. Small areas, generally where a highway crosses the ditches and provides access, are used for pasture. Most of the area is too wet for permanent pasture, but summer pasture can be grown with some success.

This soil has poor potential for cultivated crops, pasture, and hay. It has fair potential for trees and poor potential for most engineering uses.

Tree seedlings and cuttings grow well once established, but overflow and wetness make their establishment difficult. The accessibility and wetness limit the use of machinery for planting or harvesting.

The extreme variability of soil materials and excessive wetness are the major concerns in most engineering uses.

This unit is better suited to wildlife and recreation than to other uses. The water provides a gathering place for migrating water fowl, and the berms and spoils provide food. Fishing, frogging, hunting, boat riding, and motor biking are common in this unit.

This map unit is not in a capability unit or woodland ordination group.

Os—Orthents, steep. This map unit consists of soils that formed in sandy and loamy materials. The loamy, moderately sloping soils are on narrow ridgetops and make up about 15 to 20 percent of the unit. The sandy, moderately steep soils are on side slopes and toe slopes and make up about 50 to 60 percent of the unit. Slopes are 5 to 30 percent. Areas are elongated and are about 30 to 400 acres or more.

The area is typified by narrow discontinuous ridgetops less than 20 feet wide and moderately steep side slopes about 200 feet or more long. A few pits where sand and gravel were mined have been included in mapping. The drains flowing through this map unit are mostly sandy, but a few areas of Collins soil, making up less than 10 percent of the unit, were included.

Permeability is moderate in the loamy soils and rapid in the sandy soils. Runoff is medium to slow, since much of the rainfall is absorbed. Available water capacity is moderate in the loamy soils but low or very low in the sandy soils. Organic matter content is low, and natural fertility is medium to low.

Most of this unit is in second growth woodland. This unit has poor potential for cultivated crops, pasture, and hay. It also has poor potential for most engineering uses.

This unit is best suited to wildlife or recreation. Major management concerns are slope, erosion, and low available water capacity. Management practices that maintain vegetative cover are effective in controlling erosion.

Tree cuttings and seedlings survive poorly on the sandy side slopes because of the low available water capacity. Equipment is difficult to operate on the steep sandy side slopes.

The slope, sandiness of the soils, and the intricate mixture of materials make this unit poorly suited to building site development and onsite waste disposal. It is a fair source of sand.

This map unit is not in a capability unit or woodland ordination group.

Pt—Pits, gravel. This map unit consists of areas where the original soil and some of the underlying gravel and sand have been removed by excavation. The depths of excavations generally range from about 6 to 50 feet or more. Slopes range from nearly level on the floor of the pit to nearly vertical on the walls. Areas are about 5 to 50 acres or more.

The original soils have been destroyed, altered, or obscured to such a degree that identification and classification are not possible or practical.

Included with this unit in mapping, and making up less than 5 percent of the unit, are small undisturbed areas of Loring and Memphis soils.

Most areas are now inactive and idle, supporting vegetation such as shrubs, weeds, and grasses. Some areas hold water.

Pits, gravel are not in a capability unit or woodland ordination group.

Ro—Roellen silty clay. This level and nearly level, poorly drained soil is in concave natural drainageways, channels, and basins. It is adjacent to or surrounded by higher natural levees. The drainageways, channels, and basins provided most of the natural drainage prior to development of the area. Areas are generally long and narrow and are about 10 to 200 acres or more.

Typically, the surface layer is very dark gray silty clay about 13 inches thick. The subsoil is about 41 inches of dark gray, firm silty clay and clay that has mottles in shades of gray, brown, and olive. The substratum is olive gray silt loam to a depth of 60 inches or more. Some profiles have thin layers that are mostly iron and manganese concretions as much as 2 inches in diameter. In places the surface layer is less than 10 inches thick. A loamy surface layer has formed where deposits have washed from higher positions, and some areas have sandy substrata.

Included with this soil in mapping are small areas of Cairo soil. The included soil is on the old stream channel and has sandy layers at a depth of 30 to 40 inches. Cairo soil makes up about 10 percent of the unit.

Since Roellen soil is in drainageways, it is occasionally flooded. It provides an outlet for drainage of adjacent higher ridges. The seriousness of flooding is determined by the amounts of runoff from these associated ridges.

Permeability and surface runoff are slow. Reaction is medium acid to mildy alkaline in the subsoil, but varies widely and is often neutral in the surface layer because of liming practices. A perched water table often is in the upper horizons after heavy rains. Natural fertility is high, and the organic matter content is moderately low. The available water capacity is moderate. The soil shrinks and cracks when dry, and swells when wet. The surface layer is firm and works best in a narrow moisture range. When wet, it is sticky and difficult to till; when dry, it is hard and cloddy. Tillage needs to be carried out far enough in advance to allow freezing and thawing or alternate wetting and drying to help break up clods.

This soil has good potential for annual crops, pasture, hay, and bottom land trees. It has poor potential for most engineering uses.

Most areas of this soil are used for row crops. The soil is suited to soybeans, grain sorghum, cotton, wheat, and grasses and legumes for pasture and hay, where it is drained. It holds large amounts of water, but only part is available to plants. Excess surface water generally can be removed by a system of field ditches. Landforming aids drainage, fills potholes, and provides a suitable grade for supplemental irrigation. Managing crop residue to leave a protective cover on the surface, while incorporating the rest into the surface layer, helps to improve fertility and tilth.

The use of this soil for pastureland or hayland is small. Stands of perennial grasses and legumes generally have some reduction each winter and spring because of wetness. Therefore, species that can tolerate some wetness should be favored in selections. Overgrazing or grazing when the soil is wet causes compaction, puddling, and crusting of the surface. Proper stocking rates and restricted use during wet periods help maintain pasture and soil in good condition.

Roellen soil is suited to growing selected bottom land trees, but only a few areas are in woodland. Tree cuttings and seedlings survive and grow well where competing vegetation is controlled by site preparation or by spraying. The wetness of this soil presents a severe limitation for tree harvesting. Harvesting needs to be delayed until there has been an extended dry period, unless drainage is provided.

This soil has severe limitations for building site development and septic tank absorption fields. All other alternatives should be tried before building on this soil, but if no other sites are available, structures should be placed on an area of suitable fill material. Foundations need extra reinforcement if extended into the clayey horizons. The slow permeability, shrink-swell, and wetness of this soil make it poorly suited to septic tank absorption fields. Lagoon type of sewage disposal works best on this soil.

This soil is in capability subclass IIIw and woodland ordination group 2w.

Sc—Sharkey silty clay loam. This nearly level, poorly drained soil is on broad, flat to slightly convex areas. These areas are large and generally are irregular in shape. They are about 10 to 2,000 acres or more.

Typically, the surface layer is very dark grayish brown silty clay loam about 9 inches thick. The subsoil is 38 inches thick and is dark gray, sticky and plastic clay. The substratum is olive gray clay to a depth of 60 inches or more. In places the surface layer is silty clay or clay. Some drains of the Old Little River channel have loamy and sandy substrata.

Included with this soil in mapping are small areas of moderately well drained Steele soil and the poorly drained Alligator soil. The Steele soil is on small, low mounds and ridges and is less than 10 percent of the unit. Alligator soil is on similar positions but is strongly acid in the subsoil.

Permeability is very slow, and surface runoff is slow or very slow. Available water capacity is moderate, natural fertility is high, and the organic matter content is moderately low. This soil shrinks and cracks when dry but swells when wet. The surface layer has moderate shrink-swell potential. Reaction ranges from medium acid to mildly alkaline in the upper part of the subsoil but averages slightly more alkaline in the surface layer because of local liming practices. The upper part of the subsoil is strongly acid on some ridges. This soil is difficult to till, and in low places remains wet for long periods in spring and winter.

This soil has good potential for summer annuals, pasture, hay, and bottom land trees, and has fair potential for most cool season crops. It has poor potential for most engineering uses except those that impound water.

Most areas of this soil are used for soybeans, cotton, small grains, grain sorghum, and rice. This soil is suited to soybeans, cotton, small grain, and grasses where it is drained. A system of field ditches generally removes excess surface water. Landforming aids drainage, eliminates potholes, and provides a suitable grade for supplemental irrigation. This soil holds large amounts of water but only a moderate amount is available to plants. Managing crop residue to provide a protective cover, and incorporating the rest into the surface soil helps improve infiltration and soil tilth.

Where pasture grasses are used there is a hazard of crop damage by livestock during wet periods because some compaction of the surface soil will probably occur. Controlled grazing, restricted use when the soil is wet, and pasture rotation help keep the pasture and soil in good condition.

This soil is well suited to bottom land trees, and a few small areas are in native hardwoods. Tree seedlings and cuttings have difficulty withstanding the wetness in this soil, but trees grow well once established. Surface drainage by field ditches generally removes excess water, except for potholes, where landforming generally is necessary. Operation of planting or harvesting equipment is difficult during wet periods. These difficulties can be overcome by providing drainage and by harvesting in dry periods.

Because of the wetness, high shrink-swell potential, very slow permeability, and low strength, this soil is poorly suited to most engineering uses. Sewage lagoons generally can be constructed with little hazard of leaking. This soil is suited to pond reservoirs and embankments and other uses that require slow permeability.

This soil is in capability subclass IIIw and woodland ordination group 2w.

Sh—Sharkey clay. This level and nearly level, poorly drained soil is in broad to flat concave depressions or basins. This soil generally is in the lower position on the landscape. Areas are elongated and somewhat irregular and are about 10 to 1,000 acres.

Typically, the surface layer is about 5 inches of very dark gray clay. The subsoil is about 44 inches of gray clay. The substratum is gray and olive gray clay to a depth of 60 inches or more. In areas the surface layer is silty clay loam.

Included with this soil in mapping are small areas of the moderately well drained Steele soil, which occupies small, low mounds or ridges and makes up less than 10 percent of the unit.

Permeability is very slow, and surface runoff is slow or very slow. Available water capacity is moderate, and natural fertility is high. Organic matter content is moderately low. This soil shrinks and cracks when dry but swells when wet (fig. 22). Reaction ranges from medium acid to mildly alkaline in the upper part of the subsoil. However, reaction of the surface layer averages slightly more alkaline because of local liming practices. This soil is difficult to till because of the high clay content of the surface layer. Also, Sharkey soil is wetter for longer periods after rains than most adjacent soils and therefore delays field operations. It accumulates and ponds runoff from adjacent areas and generally is wet in spring and winter.

This soil has good potential for growing summer annuals, pasture, hay, and trees, and has fair potential for most cool season crops. It has poor potential for most engineering uses.

Most areas of this soil are used for soybeans, cotton, wheat, grain sorghum, and rice. The soil is suited to crops and pasture where drained by a system of field ditches. Landforming aids drainage, fills potholes, and provides a suitable grade for supplemental irrigation. This soil holds large amounts of water, but only a moderate amount is available to plants. Using minimum tillage to leave a protective surface cover and incorporating part of crop residue in the surface soil help improve tilth and increase water infiltration.

When used for pasture, there is a hazard of crop damage by livestock during wet periods. Some compaction of the surface soil also occurs. Controlled grazing, restricted use during wet periods, and pasture rotations are good pasture management practices.

This soil is well suited to bottom land trees, and a few areas are in native hardwood. Tree seedlings and cuttings are difficult to establish because of wetness. Operation of planting or harvesting equipment is difficult on this soil in wet periods. These difficulties can be overcome by providing drainage and by harvesting in dry periods.

Wetness, high content of clay, shrink-swell potential, and the low strength limit this soil for most engineering uses. However, sewage lagoons can be constructed with little hazard. This soil is suited to pond reservoirs, dikes, levees, and other uses requiring slow permeability.

This soil is in capability subclass IIIw and woodland ordination group 2w.

Sm—Sharkey-Steele complex. This map unit consists of nearly level, poorly drained and moderately well drained soils on broad basins. It is typified by low sandy spots and ridges of Steele soil surrounded by flat, lower lying, clayey Sharkey soil. Areas are about 10 to 2,000 acres or more. The complex contains about 70 to 80 percent Sharkey soil and about 20 to 30 percent Steele soil. These soils are mapped together because they are in such an intermingled pattern that it is not practical to map them separately.

Typically, the Sharkey soil has a surface layer of very dark gray clay or silty clay loam about 6 inches thick. The subsoil is about 43 inches of dark gray, sticky and plastic clay. The substratum is dark gray and olive gray clay to a depth of 60 inches or more. In places the upper layers are acid, and some areas have sand mixed with the surface layer.

Typically, the Steele soil has a surface layer of dark brown loam and fine sandy loam about 9 inches thick. Beneath this is about 16 inches of a loose, pale brown loamy sand. The next layer, about 6 inches thick, is dark grayish brown fine sandy loam. This is over a gray, sticky and plastic clay that extends to a depth of more than 60 inches. Areas of soils that have a loamy sand and sand surface layer generally are adjacent to loam areas. Where the surface layer has been cut or removed during landforming, the clayey layer is closer to the surface.

Included with these soils in mapping are small areas of Alligator soil, which are in positions similar to Sharkey soil but have an acid subsoil.

Permeability is very slow in the Sharkey soil. The available water capacity is moderate, and surface runoff is slow or very slow because of the soil's lower position on

the landscape. Sharkey soils shrink when dry and swell when moist. Reaction of the subsoil is medium acid to moderately alkaline, but reaction of the surface layer varies widely because of local liming practices. Natural fertility is high, and organic matter content is moderately low. Water often ponds, and the soil is difficult to till and prepare a suitable seedbed.

In Steele soil, the available water capacity is moderate and surface runoff is slow, since most of the rainfall is absorbed into the sandy surface layer. The underlying layers shrink when dry and swell when moist. The clayey layers of Steele soil are slightly acid or neutral; however, reaction of the surface layer varies widely because of local liming practices. This soil has low to medium fertility. Organic matter content is moderately low. A perched water table is above the clayey layers. This soil is easily tilled. It does not occur in areas large enough to be managed separately.

This unit has fair to good potential for growing cultivated crops, hay, pasture, and trees. It has fair to poor potential for most engineering uses.

Most of this unit is used for soybeans, cotton, grain sorghum, wheat, and grasses and legumes for hay and pasture. The main management concern is the wetness of the Sharkey soil. A system of field ditches generally removes excess surface water. Landforming helps to enhance drainage and eliminate potholes.

The Steele soil is somewhat droughty during extended dry periods and is subject to wind erosion unless protected. It is expected there will be some reduction in the stand of wheat in most years because of wetness. Managing crop residue to leave a protective cover on the surface reduces wind erosion on the Steele soil. In addition, this residue management increases infiltration and maintains or improves the organic matter content in both Sharkey and Steele soils.

The use of this unit for pasture and hayland is somewhat restricted, since most of the area is cultivated. The Steele soil part, where in pasture, is best used for feeding areas since it is better drained. During wet periods there is generally some stand reduction of pasture. Overgrazing or grazing when these soils are wet removes protective vegetation and increases runoff and erosion.

This unit has fair to good potential for bottom land trees, but only a few areas are in woodland. Tree seedlings and cuttings have some difficulty for the first few years because of wetness, but once established they grow well. The excessive wetness of the Sharkey soil limits the use of equipment to periods of limited rainfall. Ditches can help remove excess surface water.

The Sharkey soil part of this unit has poor potential for building site development and onsite waste disposal. It is well suited to sewage lagoons when they are properly designed and constructed. The very high shrink-swell, very slow permeability, and wetness need to be considered in the designs for buildings.

The Steele soil part of the unit is poorly suited to building site development because of its wetness. Septic tank absorption fields function poorly during wet periods. Sewage lagoons function well where sandy upper layers are sealed.

Sharkey soil is in capability subclass IIIw and woodland ordination group 2w. Steele soil is in capability subclass IIw and woodland ordination group 3s.

So—Sikeston loam. This nearly level, poorly drained soil is in flat to slightly concave depressions and basins. Areas are elongated in a general north to south direction and are about 15 to 1,000 acres or more.

Typically, the plow layer is about 5 inches of very dark brown loam. The subsurface layer is about 44 inches thick. The upper 16 inches of the subsurface layer is very dark brown, firm sandy clay loam and black clay loam. The lower part is friable, very dark gray and dark gray sandy clay loam. The substratum is dark grayish brown sand and has common distinct olive brown mottles to a depth of 60 inches or more. In places the depth to the sandy substratum is as shallow as 33 inches. Some small areas have sandy overwashes on the surface. Some areas have thin layers in the lower part of the soil that are made up mostly of fine iron and manganese oxide concretions.

Included with this soil in mapping are small areas of Cairo and Gideon soils. Cairo soil is in slightly lower positions and has clayey upper layers. Gideon soil is in slightly higher positions. The included soils make up about 5 to 10 percent of the unit.

Permeability of this soil is moderately slow, and runoff is slow or very slow. Reaction ranges from slightly acid to mildly alkaline in the subsoil, but varies widely in the surface layer. The surface layer is often neutral or mildly alkaline because of local liming practices. Natural fertility is high, organic matter content is moderately low, and available water capacity is high. The surface layer is friable and easily tilled, but if tilled when wet, this soil becomes cloddy, compact, and develops a plow pan. A water table commonly is about one foot below the surface during wet periods, which occur mostly late in winter and in spring. The sandy substratum is saturated most of the year. This soil accumulates runoff from higher adjoining areas.

This soil has good potential for cultivated summer annuals, pasture, hay, and bottom land trees. It has poor potential for most engineering uses.

Most areas of this soil are used for row crops. When drained, this soil is suited to soybeans, cotton, corn, grain sorghum, and pasture and hay. Because of wetness, wheat generally has some stand reduction in areas that are not adequately drained. A system of field ditches generally removes excess surface water. Landforming helps to eliminate potholes and provide a suitable grade for application of supplemental irrigation water. Care should be exercised in landforming to avoid

deep cuts that would bring the sandy substratum too close to the surface. Managing crop residue to provide a protective cover on the surface and incorporating the rest into the soil helps to maintain organic matter content and soil tilth.

The use of this soil for pasture and hay is small. However, overgrazing or grazing when the soil is wet causes the surface to compact and results in poor tilth. Restricted use when the soil is wet and proper stocking rates help keep pasture and soil in good condition. Deep rooted perennials have some reduction in stand in places during wet periods.

This soil is well suited to trees, but only a few areas are in native bottom land hardwoods. Tree cuttings and seedlings grow well once established, but the wetness of this soil generally causes some seedling mortality. Surface drainage, using a system of field ditches or bedding of tree rows, helps reduce wetness for young trees. Plant competition can be controlled by site preparation or spraying.

The accumulation of runoff and poor drainage make this soil poorly suited to building site development and septic tank absorption fields. If buildings are to be located on this soil, they need to be protected from overflow. Foundations and footings need to be designed to prevent damage from soil shrinking and swelling. Septic tank absorption fields function poorly because of overflow, poor drainage, and moderately slow permeability. Sewage lagoons are probably the best solution to sewage disposal, though design and construction should allow for the depth to sandy layers and the need for compaction.

This soil is in capability subclass IIIw and woodland ordination group 2w.

Wd—Wardell loam. This nearly level, poorly drained soil is in concave drainageways, or is on slightly convex natural levees. Areas are generally elongated and are about 10 to 300 acres or more.

Typically, the surface layer is very dark gray loam about 8 inches thick. The subsoil is about 45 inches thick and is dark gray and gray, firm clay loam. The substratum is dark gray loamy fine sand to a depth of 60 inches or more. In places the surface layer is fine sandy loam or clay loam. Some areas have a dark grayish brown surface layer.

Included with this soil in mapping are small areas of the poorly drained Gideon soil and somewhat poorly drained Lilbourn soil. Gideon soil generally is at slightly lower elevations and Lilbourn soil is on small ridges or knolls. The included soils make up about 8 to 10 percent of the unit.

Permeability and surface runoff are slow. Reaction ranges from very strongly acid to slightly acid in the subsoil, but ranges to neutral in the surface layer in many places because of local liming practices or irrigation. Natural fertility is medium or high; organic matter content is moderately low and the available water capacity is high. The surface layer is friable and easily tilled. When it is not protected, the soil puddles and forms a crust after hard rains. A perched water table generally is at a depth of about 18 inches in winter and spring. Concave drains accumulate runoff from higher positions, and some overflow for short periods.

This soil has good potential for growing cultivated crops, hay, and pasture, and fair potential for trees. It has poor potential for most engineering uses.

Most areas of this soil are used for row crops. It is suited to soybeans, cotton, wheat, corn, grain sorghum, and grasses and legumes for hay and pasture. Wetness is the main management concern, but excess surface water generally can be removed by a system of field ditches. Landforming not only helps drainage but eliminates potholes and provides a uniform grade for supplemental irrigation. Areas between the St. Francis River and its levee are subject to overflow. Managing crop residue to leave a protective cover on the surface and incorporating the rest into the soil help to maintain organic matter content and reduce crusting. A plowpan often develops in this soil if the soil is tilled when wet.

The use of this soil for pasture or hayland is limited, since most of it is used for cropland. Compaction and poor tilth result from grazing when the soil is wet. Timely delay of grazing, and restricted use during wet periods are necessary to maintain the soil and pasture in good condition.

This soil is moderately well suited to bottom land trees, but only a few areas are in native hardwoods. Tree seedlings and cuttings grow well once established, but seedling mortality is common in areas without proper drainage. Plant competition can be controlled by spraying or prescribed burning. Because of the natural wetness of this soil, planting and harvesting is generally restricted to summer and fall.

This soil is poorly suited to building site development and onsite waste disposal. Septic tank absorption fields function poorly during wet periods. Buildings constructed in or on the subsoil are subject to stress from the soil's shrink-swell. Areas in drainageways are subject to local flooding, and overflow history needs to be considered. Adding suitable base for local roads helps to overcome shrink-swell where the road is built in the subsoil.

Sewage lagoons are probably the best solution to waste disposal, but the depth to sandy layers and need for compaction should be considered in design and construction.

This soil is in capability subclass IIw and woodland ordination group 3w.

Use and management of the soils

The soil survey is a detailed inventory and evaluation of the most basic resource of the survey area—the soil.

It is useful in adjusting land use, including urbanization, to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in uses of the land.

While a soil survey is in progress, soil scientists, conservationists, engineers, and others keep extensive notes about the nature of the soils and about unique aspects of behavior of the soils. These notes include data on erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic tank disposal systems, and other factors affecting the productivity, potential, and limitations of the soils under various uses and management. In this way, field experience and measured data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section is useful in planning use and management of soils for crops and pasture, woodland, as sites for buildings, highways and other transportation systems, sanitary facilities, and parks and other recreation facilities, and for wildlife habitat. From the data presented, the potential of each soil for specified land uses can be determined, soil limitations to these land uses can be identified, and costly failures in houses and other structures, caused by unfavorable soil properties, can be avoided. A site where soil properties are favorable can be selected, or practices that will overcome the soil limitations can be planned.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area and on the environment. Productivity and the environment are closely related to the nature of the soil. Plans should maintain or create a land-use pattern in harmony with the natural soil.

Contractors can find information that is useful in locating sources of sand and gravel, roadfill, and topsoil. Other information indicates the presence of wetness or very firm soil horizons that cause difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists also can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are influenced by the nature of the soil.

Crops and pasture

The major management concerns in the use of the soils for crops and pasture are described in this section. In addition, the crops or pasture plants best suited to the soil, including some not commonly grown in the survey area, are discussed; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are presented for each soil.

This section provides information about the overall agricultural potential of the survey area and about the management practices that are needed. The information is useful to equipment dealers, land improvement contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section "Soil maps for detailed planning." Planners of management systems for individual fields or farms should also consider the detailed information given in the description of each soil.

More than 300,000 acres in Dunklin County were used for crops and pasture in 1975, according to the Missouri Crop and Livestock Reporting Service. Of this total, 217,000 acres were used for soybeans and 82,000 acres for wheat, much of which was followed by soybeans. Cotton acreages were down from a norm of about 80,000 acres to 64,500 acres. About 4,800 acres were in corn; 4,900 in grain sorghum; 3,000 in pasture; about 3,000 in orchards; and about 6,000 acres were in purple hull peas. Watermelons and cantaloupes totaled about 1,000 acres. Smaller acreages were used for such crops as peanuts, pecans, sweet potatoes, tomatoes, and other horticultural crops.

The potential of the soils of Dunklin County for increased production of food and fiber is good. There are about 10,000 acres of woodland that has potential for crops. These areas are generally wet, subject to flooding, or are steep, but some of these areas could be cropped if properly managed. More food and fiber can be produced from existing farmland if the limitations of wetness or overflow are overcome.

Acreages for urban or built-up areas are increasing, but at present do not present a great threat to claiming land used for crops. The use of this soil survey to help make land use decisions that influence farming and urban uses is discussed in the section "General soil map for broad land-use planning."

Soil drainage is the major management concern on about half of the cropland and pasture in Dunklin County. The soils are naturally wet because of their position on the landscape or slow permeability, or both. Areas along the St. Francis River overflow because of runoff from the river's watershed and the flow from Wappapelo Dam. Many clayey soils such as Sharkey and Alligator soils are in positions on the landscape that receive runoff. When these soils receive runoff, and because they are very slowly permeable, they pond water for long periods. Areas of Cairo, Roellen, Sikeston, and Gideon soils also accumulate water from adjacent slopes. Excessive water is removed from most of the soils through a system of field ditches. Many areas are graded or shaped to provide drainage. The poorly drained Calhoun soils are wet in winter and spring because of a perched water table but dry out to produce good summer crops.

The somewhat poorly drained soils such as Falaya, Lilbourn, and Dundee are considered good cropland except where they flood along the St. Francis River.

Farrenburg and Canalou soils are moderately well drained and have some limitations because of wetness. However, the wetness is not a major problem for crops. Loring soils on uplands are also moderately well drained, but because of the runoff and slope, wetness does not present a difficult problem.

Most excess surface water can easily be removed by a system of field ditches or landforming. Land shaping eliminates potholes and provides a suitable grade for the addition of supplemental irrigation water.

Soil erosion is the major concern on about 11,000 acres of the county. Not all of this acreage is in crops or pasture. Some of it is in orchards, some in pasture, and some in woodland. Loring, Memphis, and Orthents, steep soils have enough slope that they are subject to erosion. Loss of the surface layer through erosion reduces the productivity and leaves the soil with poor tilth. The surface layer contains most of the nutrients and organic matter needed for plant growth. When the surface layer is lost and the subsoil is in the plow layer, the tilth is difficult to maintain. This eroded surface puddles and crusts, causing a substantially lower intake rate.

Loring soils are especially damaged by the loss of the surface layer, since they have a fragipan that limits the water capacity and root development. The eroded materials are transported by water into ponds and streams. Control of erosion minimizes stream pollution by sediment and improves the quality of water for municipal and recreational uses, as well as for fish and wildlife. Cover crops, minimum tillage, terraces, no-till, diversions, permanent vegetation, and mechanical practices are used to control erosion.

Soil blowing is a hazard, particularly on the sandy Malden soils and the Canalou and Silverdale soils. Broseley and Bosket soils are also subject to blowing if not protected. Soil blowing not only causes soil loss but damages young plants. Winter cover crops, field windbreaks, and wind stripcrops help to control soil blowing (fig. 23).

Soil fertility is naturally low in some soils of the county. However, most of these soils respond well to the addition of fertilizer or lime. The soils of the uplands and west of the uplands are mostly strongly or very strongly acid unless limed. Soils east of the uplands are geologically younger and generally are not so acid. Many soils on the uplands and alluvial soils west of the uplands are low in potash. Most of the soils in the county have an adequate supply of phosphorus. Nitrogen is the most widely used fertilizer. Most soils of the county benefit from addition of lime.

Soil tilth is an important factor in seedbed preparation and crop production. Soils with good tilth have granular structure in the surface layer, are easily tilled, and are porous.

The sandy surface layer of soils such as Malden and Canalou soils are easily tilled into a good seedbed, but tend to blow. The fine sandy loam and sandy loam surface layer of Bosket, Farrenburg, and Lilbourn soils is easily tilled, holds moisture well, and is subject to soil blowing if in large, unprotected areas. The silt loam and loam surface layer of Calhoun, Crowley, Dubbs, Dundee, Falaya, Gideon, Loring, Memphis, and Wardell soils are easily tilled and make a good seedbed. Where organic matter content is low, in such soils as Calhoun and Crowley, a crust is formed on the surface after heavy rains. Once the crust forms it reduces infiltration. Maintaining a protective residue cover and returning organic residue to the surface layer is an effective method of reducing soil crusting.

The silty clay loam, silty clay, and clay surface layer of such soils as Sharkey, Aligator, Cairo, Roellen, and Jackport soils is difficult to work into a good seedbed. If worked when the soil is wet, the surface tends to become a mass of hard clods when it dries. Plowing in fall or early in spring, with subsequent rains, generally melts the clods into small aggregates that make a more desirable seedbed.

Field crops that are suited to local soils and the climate include many crops that are not now commonly grown. If other conditions are favorable, rice, peanuts, sunflowers, potatoes, pecans, popcorn, sweet potatoes, and other crops can be grown. Oats, barley, alfalfa, and other close-growing crops can also be grown.

Special crops grown commercially in the county are rice, watermelons, strawberries, cantaloupes, peaches, apples, pears, and nectarines. Large areas can be used to produce these crops as well as nursery plants, fruits, vegetables, and berries. Several thousand acres of soils in the county are desirable for catfish farming.

Supplemental irrigation is practiced on soils throughout the county, except on the uplands. This irrigation is used on an as-needed basis, and selected areas are not irrigated in some years, but others are irrigated many times. Most irrigation is the furrow type, with some sprinkler systems used in areas with rough surfaces (fig. 24). Most corn grown in the county is irrigated. Some grain sorghum, cotton, and soybeans are irrigated, but generally not to the same extent as corn. Soils that are irrigated range in texture from clayey to sandy and in drainage from poor to excessive.

Some areas are planted with 2 to 4 rows of cotton alternating with 1, 2, or 4 rows of fallow. This increases the amount of sunlight, moisture, and fertility available to plants and generally increases yields.

Many of the levees, such as those along Elk Chute and the St. Francis River, are used for pasture and hay crops.

The latest information and suggestions for growing special crops can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

Yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. Absence of an estimated yield indicates that the soil is not suited to the crop or the crop is not commonly grown on the soil.

The estimated yields were based mainly on the experience and records of farmers, conservationists, and extension agents. Results of field trials and demonstrations and available yield data from nearby counties were also considered.

The yields were estimated assuming that the latest soil and crop management practices were used. Hay and pasture yields were estimated for the most productive varieties of grasses and legumes suited to the climate and the soil. A few farmers may be obtaining average yields higher than those shown in table 5.

The management needed to achieve the indicated yields of the various crops depends on the kind of soil and the crop. Such management provides drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate tillage practices, including time of tillage and seedbed preparation and tilling when soil moisture is favorable; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residues, barnyard manure, and green-manure crops; harvesting crops with the smallest possible loss; and timeliness of all fieldwork.

The estimated yields reflect the productive capacity of the soils for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not included because the acreage of these crops is small. The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide information about the management concerns and productivity of the soils for these crops.

Capability classes and subclasses

Capability classes and subclasses show, in a general way, the suitability of soils for most kinds of field crops. The soils are classed according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forest trees, or for engineering purposes.

In the capability system, all kinds of soil are grouped at three levels: capability class, subclass, and unit. The capability class and subclass are defined in the following paragraphs (*29*). A survey area may not have soils of all classes.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and landforms have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class; they are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is indicated in table 6. All soils in the survey area except those named at a level higher than the series are included. Some of the soils that are well suited to crops

and pasture may be in low-intensity use, for example, soils in capability classes I and II. Data in this table can be used to determine the farming potential of such soils.

The capability subclass is identified in the description of each soil map unit in the section "Soil maps for detailed planning."

Woodland management and productivity

This section prepared by Gary R. Nordstrom, forester, Soil Conservation Service.

In 1972 about 20,100 acres (*12*), or 6 percent of Dunklin County, was used for growing trees. This represents a loss of 10,700 acres since 1959, when there was 30,800 acres of forest land. The conversion of woodland to cropland is the primary reason for this decrease. The wooded tracts are owned by private individuals and are relatively small. Timber production, recreation, and wildlife are the main uses of the woodland, and there also are several Christmas tree plantations.

The Sharkey soils and Falaya-Fountain soil association contains the largest percentage of bottom land hardwood. The principal forest type is oak-gum-cypress consisting of pin oak, cherrybark oak, willow oak, sweetgum, hickory, pecan, cottonwood, green ash, and baldcypress. These soils have good potential for woodland.

The Crowley-Calhoun-Foley soil association contains scattered tracts of woodland. It has moderate potential productivity for growing trees except for Foley soil, which is low because of the high sodium content. The principal species present are white oak, black oak, post oak, hickory, elm, and hackberry.

The Loring-Memphis-Falaya soil association contains the largest percentage of upland hardwood. The principal forest type is upland oak consisting of white oak, black oak, cherrybark oak, red oak, sweetgum, yellow-poplar, and black walnut. The Loring and Memphis soils have good potential for upland hardwood and pine, and Falaya soil has good potential for bottom land hardwood.

The Malden-Canalou-Bosket, Dundee-Silverdale, Gideon-Lilbourn and Dubbs soil associations contain only small amounts of woodland. The potential productivity of these soils for growing trees ranges from moderate to good (fig. 25).

Lafe and Foley soils were not rated for woodland use and management because of the high sodium content and resulting low productivity.

Table 7 contains information useful to woodland owners or forest managers planning use of soils for wood crops. Map unit symbols for soils suitable for wood crops are listed, and the ordination symbol for each soil is given. All soils bearing the same ordination symbol require the same general kinds of woodland management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates insignificant limitations or restrictions. If a soil has more than one limitation, priority in placing the soil into a limitation class is in the following order: x, w, t, d, c, s, f, and r. Only letters w, s, r, and o are used for Dunklin county.

In table 7 the soils are also rated for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of major soil limitations.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if some measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or equipment; *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree that the soil affects expected mortality of planted tree seedlings. Plant competition is not considered in the ratings. Seedlings from good planting stock that are properly planted during a period of sufficient rainfall are rated. A rating of *slight* indicates that the expected mortality of the planted seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *plant competition* indicate the degree to which undesirable plants are expected to invade or grow if openings are made in the tree canopy. The invading plants compete with native plants or planted seedlings by impeding or preventing their growth. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; *severe* means that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed for the control of undesirable plants.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index.* This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Important trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suitable for commercial wood production and that are suited to the soils.

The site index curves used for the tree species listed in Table 7 are as follows: Eastern cottonwood (*7*), green ash (*10*), water oak, pin oak, willow oak, Shumard oak (*8*), cherrybark oak (*9*), Nuttall oak (*27*), sweetgum (*6*), white oak, black oak, northern red oak, southern red oak (*26*), shortleaf pine, loblolly pine (*11*), and yellow-poplar (*5*).

Ratings of erosion hazard indicate the need for careful design and construction of roads, skid trails, and fire lanes to minimize the percent of slope, length of slope, and concentration of water. Erosion control measures, such as ditches, culverts, outslope road surface, waterbreaks, and seeding disturbed areas to grass may be necessary.

Ratings of equipment limitation indicate a need to consider rubber-tired equipment rather than crawler type tractors to reduce soil disturbance and minimize damage to the residual stand. The use of equipment for management operations needs to be timed to seasons of the year when the soil is relatively dry, for soils of subclass w.

Special operations, such as yarding logs uphill with cable, may be an acceptable alternative to minimize the use of rubber-tired and crawler tractors on steep slopes.

Seedling mortality ratings may indicate the need for special planting stock of larger size than usual, or containerized stock to achieve better survival. The possibility of the need for reinforcement plantings should be recognized.

Plant competition ratings of moderate or severe indicate the need for careful and thorough site preparation by mechanical or chemical means, or both. The need for release treatments may be essential to insure development of the new crop.

Windbreaks and environmental plantings

Windbreaks are established to protect livestock, buildings, and yards from wind and snow. Windbreaks also help protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broad-leaved and coniferous species provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field, the interval depending on erodibility of the soil. They protect cropland and crops from wind, hold snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. A healthy planting stock of suitable species planted properly on a well prepared site and maintained in good condition can insure a high degree of plant survival.

Table 8 shows the height that locally grown trees and shrubs are expected to reach on various kinds of soil in 20 years. The estimates in table 8, based on measurements and observation of established plantings that have been given adequate care, can be used as a guide in planning windbreaks and screens. Additional information about planning windbreaks and screens and the planting and care of trees can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from nurserymen.

Engineering

Harry N. Means, assistant state conservation engineer, assisted in writing this section.

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit from this information are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers and ranchers.

The ratings in the engineering tables are based on test data and estimated data in the "Soil properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock that is within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope stability, and other factors of expected soil behavior in engineering uses. As appropriate, these values can be ap-

plied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to (1) select potential residential, commercial, industrial, and recreational uses; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 9 shows, for each kind of soil, the degree and kind of limitations for building site development; table 10, for sanitary facilities; and table 12 shows the kind of limitations for water management. Table 11 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

Some of the terms used in this soil survey have a special meaning in soil science. Many of these terms are defined in the Glossary.

Building site development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets are indicated in table 9. A *slight* limitation indicates that soil properties generally are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates that one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are made for pipelines, sewerlines, communications and power transmission lines, basements, open ditches, and cemeteries. Such digging or trenching is influenced by soil wetness caused by a seasonal high water table; the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, or dense soil layers. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is given, and the presence of very firm or extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and *small commercial buildings* referred to in table 9 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence of the structure from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Slope and gravel in or on the soil are also important considerations in the choice of sites for these structures and were considered in determining the ratings. Susceptibility to flooding is a serious hazard.

Local roads and streets referred to in table 9 have an all-weather surface that can carry light to medium traffic all year. They consist of a subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of

roads and streets. The classifications of the soil and the soil texture, density, shrink-swell potential, and potential frost action are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, slope, and depth to compact layers affect stability and ease of excavation.

Sanitary facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 10 shows the degree and kind of limitations of each soil for such uses and for use of the soil as daily cover for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required. Soil suitability is rated by the terms *good*, *fair*, or *poor*, which, respectively, mean about the same as the terms *slight*, *moderate*, and *severe*.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability, depth to seasonal high water table, and susceptibility to flooding. Excessive slope can cause lateral seepage and surfacing of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

In some soils, loose sand and gravel is less than 4 feet below the tile lines. In these soils the absorption field does not adequately filter the effluent, and ground water in the area may be contaminated.

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table can be installed or the size of the absorption field can be increased so that performance is satisfactory.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons have a nearly level floor and cut slopes or embankments of compacted soil material. Aerobic lagoons generally are designed to hold sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Unless the soil has very slow permeability, contamination of ground water is a hazard where the seasonal high water table is above the level of the lagoon floor. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the suitability of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soil material affect the performance of embankments.

Sanitary landfill is a method of disposing of solid waste by placing refuse in successive layers either in excavated trenches or on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil material. Landfill areas are subject to heavy vehicular traffic. Risk of polluting ground water and trafficability affect the suitability of a soil for this use. The best soils have a loamy or silty texture, have moderate to slow permeability, are deep to a seasonal water table, and are not subject to flooding. Clayey soils are likely to be sticky and difficult to spread. Sandy or gravelly soils generally have rapid permeability, which might allow noxious liquids to contaminate ground water. Soil wetness can be a limitation, because operating heavy equipment on a wet soil is difficult. Seepage into the refuse increases the risk of pollution of ground water.

Ease of excavation affects the suitability of a soil for the trench type of landfill. A suitable soil is deep to bedrock and free of large stones and boulders. If the seasonal water table is high, water will seep into trenches.

Unless otherwise stated, the limitations in table 10 apply only to the soil material within a depth of about 6 feet. If the trench is deeper, a limitation of slight or moderate may not be valid. Site investigation is needed before a site is selected.

Daily cover for landfill should be soil that is easy to excavate and spread over the compacted fill in wet and dry periods. Soils that are loamy or silty and free of stones or boulders are better than other soils. Clayey soils may be sticky and difficult to spread; sandy soils may be subject to soil blowing.

The soils selected for final cover of landfills should be suitable for growing plants. Of all the horizons, the A horizon in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the A horizon for use as the surface layer of the final cover is desirable.

Where it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available

and depth to a seasonal high water table in soils surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas. These factors include slope, erodibility, and potential for plant growth.

Construction materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 11 by ratings of good, fair, poor, or unsuited. The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet.

Roadfill is soil material used in embankments for roads. Soils are evaluated as a source of roadfill for low embankments, which generally are less than 6 feet high and less exacting in design than high embankments. The ratings reflect the ease of excavating and working the material and the expected performance of the material where it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about some of the soil properties that influence such performance is given in the descriptions of the soil series.

The ratings apply to the soil material between the A horizon and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within their profile. The estimated engineering properties in table 15 provide specific information about the nature of each horizon. This information can help determine the suitability of each horizon for roadfill.

Soils rated *good* are coarse grained. They have low shrink-swell potential, and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as moderate shrink-swell potential, moderately steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor*.

Sand and *gravel* are used in great quantities in many kinds of construction. The ratings in table 11 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 15.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, slope, and amount of stones. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are low in content of gravel, and have gentle slopes. They are low in soluble salts that can limit or prevent plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy soils or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel, or soluble salt.

Soils rated *poor* are very sandy soils and very firm clayey soils; soils with suitable layers less than 8 inches thick; soils having large amounts of gravel, or soluble salt; steep soils; and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter, a surface horizon is generally preferred for topsoil because of its organic-matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter.

Water management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 12 the soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water-control structures.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have a low seepage potential, which is determined by permeability and the depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has favorable stability, shrink-swell potential, shear strength,

and compaction characteristics. Large stones and organic matter in a soil downgrade the suitability of a soil for use in embankments, dikes, and levees.

Drainage of soil is affected by such soil properties as permeability; texture; depth to bedrock, hardpan, or other layers that affect the rate of water movement; depth to the water table; slope; stability of ditchbanks; susceptibility to flooding; salinity and alkalinity; and availability of outlets for drainage.

Irrigation is affected by such features as slope, susceptibility to flooding, hazards of water erosion and soil blowing, texture, presence of salts and alkali, depth of root zone, rate of water intake at the surface, permeability of the soil below the surface layer, available water capacity, need for drainage, and depth to the water table.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to intercept runoff. They allow water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock, hardpan, or other unfavorable material; large stones; permeability; ease of establishing vegetation; and resistance to water erosion, soil blowing, soil slipping, and piping.

Grassed waterways are constructed to channel runoff to outlets at a nonerosive velocity. Features that affect the use of soils for waterways are slope, permeability, erodibility, wetness, and suitability for permanent vegetation.

Recreation

Edward A. Gaskins, biologist, Soil Conservation Service, assisted in the preparation of this section.

The Statewide Comprehensive Outdoor Recreation Plan (SCORP) shows a total of 1,829 acres of existing recreational developments in Dunklin County (*23*). The facilities listed include 183 acres of playfields, 25,000 square feet of swimming area, 1,530 acres of hunting areas, and 32 acres of picnicking areas. The report indicates a need to increase bike, horse, and hiking trails, game fishing, boating, camping, and hunting areas. Development of such activities would meet the county needs based on a projected decrease in total population (19,451) by the year of 1990. There are few state owned lands open to the public. The Armstrong Wildlife Area (548 acres) and the Ben Cash Memorial Wildlife Area (982 acres) are the only ones listed for Dunklin County. Both feature hunting for upland game, forest game, and waterfowl (fig. 26).

The NACD, Nationwide Outdoor Recreation Inventory, lists ten private recreation enterprises in operation within the county (*24*). They consist of five pay fishing areas, three campgrounds, and two golf courses. The committee which made this inventory felt that water sports areas and additional fishing areas were the two recreational facilities most needed in the county.

The soils of the survey area are rated in table 13 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreation use by the duration and intensity of flooding and the season when flooding occurs. Onsite assessment of height, duration, intensity, and frequency of flooding is essential in planning recreation facilities.

The degree of the limitation of the soils is expressed as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations are minor and easily overcome. *Moderate* means that the limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 13 can be supplemented by information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 10, and interpretations for dwellings without basements and for local roads and streets, given in table 9.

Camp areas require such site preparation as shaping and leveling for tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils for this use have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes can greatly increase the cost of constructing camp sites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for use as picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes that will increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is firm after rains, and is not dusty when dry. If shaping is required to obtain a uniform grade, the depth of the soil should be enough to allow necessary grading.

Paths and trails for walking, horseback riding, bicycling, and other uses should require little or no cutting and filling. The best soils for this use are those that are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once during the annual period of use. They should have moderate slopes and have few or no stones or boulders on the surface.

Wildlife habitat

Edward A. Gaskins, biologist, Soil Conservation Service, assisted in the preparation of this section.

Dunklin County is one of seven southeast counties which make up the Mississippi Lowlands Zoogeographic Region of Missouri (*25*). Topographically, this region forms the northern extremity of the great Mississippi Valley Delta that begins at the Gulf of Mexico. Historically, this county was once a part of a great cypress swamp, but over the past 100 years drainage and timber activities have converted the majority of the area to farmland. The St. Francis River is the only remaining river that has not been completely channelized. Today, approximately 6 percent of the land area is wooded, and the remainder is now cultivated land and pasture (*22*). Wildlife populations are mainly the farm game species. Adequate cover, extending into food producing areas, is the major habitat element missing in Dunklin County. This region enjoys the highest concentration of migrating mourning dove in Missouri (*22*). Waterfowl populations are mainly concentrated in the remaining wetlands along the St. Francis River and the Little River drainage system. Muskrat, mink, and a few otter are also found in this part of the state.

The Crowley-Calhoun-Foley, Gideon-Lilbourn, Malden-Canalou-Bosket, Dubbs, Sharkey, and Dundee-Silverdale soil associations, along with that part of the Falaya-Fountain soil association outside the St. Francis River levee, constitute the principal cropland areas of the county. It is estimated that about 90 to 95 percent of the county is used for cultivated crops. These associations provide the majority of habitat suitable for openland wildlife species. However, the extremely large fields and serious lack of woody, brushy, and herbaceous cover prevent much of this territory from being fully occupied by openland wildlife species. Surveys indicate that this survey area has one of the lowest populations of quail and rabbit of any area in the state (*22*). High water tables limit the populations of burrowing species. Dove populations are considered to be high in these soil associations.

The Loring-Memphis-Falaya soils, that part of the Falaya-Fountain soil association within the St. Francis levee, and isolated woodland tracts scattered throughout other soil associations, furnish the main habitat for woodland wildlife species in Dunklin County. A sizable wooded tract still exists in the Sharkey soil association southeast of Hornersville. This area supports the only known turkey population in the county. The birds are believed to come from the Big Lake Wildlife Area just across the state line in Arkansas. Deer and squirrel are also hunted in this area. The Loring-Memphis-Falaya soil association on Crowleys Ridge is the only upland part of the county. This area provides the best variety and interspersion of various cover types of any association. Existing populations of game species remain low as additional acres are converted from woodland to other land uses.

The major local waterfowl areas are in the Falaya-Fountain soil association along the St. Francis River and throughout the Little River drainage system in the Sharkey soil association. Waterfowl use is also recorded along other drainage systems in the remaining soil associations. Those areas furnish local residents with good hunting opportunities during the migratory season.

The fishery resource is limited to the St. Francis River area, extensive drainage ditches, borrow pits, and scattered ponds. The Little River drainage system receives heavy fishing pressure from local residents who also use the lower part for water-based recreation activities. Principal river and drainage ditch fish are carp; carpsucker; buffalo; largemouth bass; crappie; freshwater drum; bluegill; and the channel, flathead, and black bullhead catfish. Opportunities for lake fishing are restricted to six fee fishing areas (129 acres of water) and numerous farm ponds scattered throughout the county. These areas are generally stocked with largemouth bass, channel catfish, or bluegill, either alone or in combination with each other.

Soils directly affect the kind and amount of vegetation that is available to wildlife as food and cover, and they affect the construction of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, and water. If any one of these elements is missing, is inadequate, or is inaccessible, wildlife either are scarce or do not inhabit the area.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by helping the natural establishment of desirable plants.

In table 14, the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in planning for parks, wildlife refuges, nature study areas, and other developments for wildlife; selecting areas that are suitable for wildlife; selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat; and determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if

the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of wildlife are very severe, and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils having such a rating.

The elements of wildlife habitat are briefly described in the following paragraphs.

Grain and seed crops are seed-producing annuals used by wildlife. The major soil properties that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, barley, millet, soybeans, and milo.

Grasses and legumes are domestic perennial grasses and herbaceous legumes that are planted for wildlife food and cover. Major soil properties that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lespedeza, switchgrass, orchardgrass, indiangrass, clover, trefoil, alfalfa, and crownvetch.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide food and cover for wildlife. Major soil properties that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, pokeweed, foxtail, croton, and partridgepea.

Hardwood trees and the associated woody understory provide cover for wildlife and produce nuts or other fruit, buds, catkins, twigs, bark, or foliage that wildlife eat. Major soil properties that affect growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of native plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackhaw, persimmon, sassafras, and walnut.

Coniferous plants are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Soil properties that have a major effect on the growth of coniferous plants are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, cedar, and baldcypress.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, or foliage used by wildlife or that provide cover and shade for some species of wildlife. Major soil properties that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and moisture. Examples of shrubs are sumac, wild plum, button bush, and certain dogwoods. Examples of fruit-producing shrubs that are commercially available for planting are autumn-olive, Amur honeysuckle, hawthorne, and shrub lespedeza.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, cutgrass, cattail, rushes, sedges, and buttonbush.

Shallow water areas are bodies of water that have an average depth of less than 5 feet and that are useful to wildlife. They can be naturally wet areas, or they can be created by dams or levees or by water-control structures in marshes or streams. Major soil properties affecting shallow water areas are wetness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The kinds of wildlife habitat are briefly described in the following paragraphs.

Openland habitat consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The kinds of wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail rabbit, red fox, woodchuck, and mourning dove.

Woodland habitat consists of areas of hardwoods or conifers, or a mixture of both, and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Wetland habitat consists of open, marshy or swampy, shallow water areas where water-tolerant plants grow. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Soil properties

Extensive data about soil properties are summarized on the following pages. The two main sources of these

data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of selected soil samples from typical profiles.

In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to determine all major properties of key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many soil series not tested are available from nearby survey areas.

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classifications, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present data about pertinent soil and water features.

Engineering properties

Table 15 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 15 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Soil series and morphology."

Texture is described in table 15 in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified Soil Classification System (Unified) (*32*) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*1*).

The *Unified* system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, CL-ML.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified in group A-8 on the basis of visual inspection.

When laboratory data are available, the A-1, A-2, and A-7 groups are further classified as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The estimated classification, without group index numbers, is given in table 15. Also in table 15 the percentage, by weight, of rock fragments more than 3 inches in diameter is estimated for each major horizon. These estimates are determined mainly by observing volume percentage in the field and then converting that, by formula, to weight percentage.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard) is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and *plasticity index* indicate the effect of water on the strength and consistence of soil. These indexes are used in both the Unified and AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior. Range in liquid limit and plasticity index are estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

In some surveys, the estimates are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount across classifi-

cation boundaries (1 or 2 percent), the classification in the marginal zone is omitted.

Physical and chemical properties

Table 16 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as a range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Salinity is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of the nonirrigated soils. The salinity of individual irrigated fields is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of individual fields can differ greatly from the value given in table 16. Salinity affects the suitability of a soil for crop production, its stability when used as a construction material, and its potential to corrode metal and concrete.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss per acre per year.

Wind erodibility groups are made up of soils that have similar properties that affect their resistance to soil blowing if cultivated. The groups are used to predict the susceptibility of soil to blowing and the amount of soil lost as a result of blowing. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands, and very fine sands. These soils are extremely erodible, so vegetation is difficult to establish. They are generally not suitable for crops.

2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible, but crops can be grown if intensive measures to control soil blowing are used.

3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible, but crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible, but crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible, but crops can be grown if measures to control soil blowing are used.

5. Loamy soils that are less than 18 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible, but crops can be grown if measures to control soil blowing are used.

6. Loamy soils that are 18 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except

silty clay loams. These soils are very slightly erodible, and crops can easily be grown.

7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible, and crops can easily be grown.

8. Stony or gravelly soils and other soils not subject to soil blowing.

Soil and water features

Table 17 contains information helpful in planning land uses and engineering projects that are likely to be affected by soil and water features.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and have received precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of deep, well drained to excessively drained sands or gravels. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils that have a layer that impedes the downward movement of water or soils that have moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clay soils that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding is the temporary covering of soil with water from overflowing streams, with runoff from adjacent slopes, and by tides. Water standing for short periods after rains or after snow melts is not considered flooding, nor is water in swamps and marshes. Flooding is rated in general terms that describe the frequency and duration of flooding and the time of year when flooding is most likely. The ratings are based on evidence in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with increasing depth; and absence of distinctive soil horizons that form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding and on information that relates the position of each soil on the landscape to historic floods.

The generalized description of flood hazards is of value in land-use planning and provides a valid basis for land-use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table is the highest level of a saturated zone more than 6 inches thick for a continuous period of more than 2 weeks during most years. The depth to a seasonal high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed in many borings made during the course of the soil survey. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table, that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. Only saturated zones above a depth of 5 or 6 feet are indicated.

Information about the seasonal high water table helps in assessing the need for specially designed foundations, the need for specific kinds of drainage systems, and the need for footing drains to insure dry basements. Such information is also needed to decide whether or not construction of basements is feasible and to determine how septic tank absorption fields and other underground installations will function. Also, a seasonal high water table affects ease of excavation.

Depth to bedrock is shown for all soils that are underlain by bedrock at a depth of 5 to 6 feet or less. For many soils, the limited depth to bedrock is a part of the definition of the soil series. The depths shown are based on measurements made in many soil borings and on other observations during the mapping of the soils. The kind of bedrock and its hardness as related to ease of excavation is also shown. Rippable bedrock can be excavated with a single-tooth ripping attachment on a 200-horsepower tractor, but hard bedrock generally requires blasting.

Potential frost action refers to the likelihood of damage to pavements and other structures by frost heaving and low soil strength after thawing. Frost action results from the movement of soil moisture into the freezing temperature zone in the soil, which causes ice lenses to form. Soil texture, temperature, moisture content, porosity, permeability, and content of organic matter are the most important soil properties that affect frost action. It is assumed that the soil is not covered by insulating vegetation or snow and is not artificially drained. Silty and clayey soils that have a high water table in winter are most susceptible to frost action. Well drained very gravelly or sandy soils are the least susceptible.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil horizons is more susceptible to corrosion than an installation that is entirely within one kind of soil or within one soil horizon.

Soil series and morphology

In this section, each soil series recognized in the survey area is described in detail. The descriptions are arranged in alphabetic order by series name.

Characteristics of the soil and the material in which it formed are discussed for each series. The soil is then compared to similar soils and to nearby soils of other series. Then a pedon, a small three-dimensional area of soil that is typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (*28*). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series in this survey area. Phases, or map units, of each soil series are described in the section "Soil maps for detailed planning."

Alligator series

The Alligator series consists of deep, poorly drained, very slowly permeable soils that formed in acid alluvial slack water clays on low convex ridges and basins, and are known locally as "gumbo" or "yellow-gumbo." Slopes are 0 to 2 percent.

Alligator soils are similar and adjacent to Sharkey soils. Sharkey soils are less acid and are in a lower landscape position than Alligator soils.

Typical pedon of Alligator silty clay loam about 1,625 feet west and 15 feet north of center of Sec. 34, T. 18 N., R. 10 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silty clay loam, grayish brown (10YR 5/2) dry; weak fine granular structure; firm; few roots; strongly acid; abrupt smooth boundary.

B1g—7 to 11 inches; dark gray (10YR 4/1) and gray (10YR 5/1) clay; common fine distinct yellowish brown (10YR 5/6 and 10YR 5/8) mottles; weak fine subangular and weak fine angular blocky structure; firm; few fine roots; few fine dark concretions (Fe & Mn oxides); few slickensides; strongly acid; clear smooth boundary.

B2g—11 to 30 inches; light brownish gray (10YR 6/2) clay; common fine distinct yellowish brown (10YR 5/6 and 10YR 5/8) mottles; moderate medium subangular and angular blocky structure; firm; few fine roots; few slickensides; few fine dark concretions (Fe & Mn oxides); very strongly acid; clear smooth boundary.

B3g—30 to 49 inches; gray (5Y 5/1) clay; few fine faint light olive brown and common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; firm; few roots; few slickensides; few fine dark concretions (Fe & Mn oxides); very strongly acid; gradual wavy boundary.

Cg—49 to 78 inches; dark gray (5Y 4/1) and gray (5Y 5/1) clay; few fine faint grayish brown and few fine prominent yellowish brown (10YR 5/6 and 10YR 5/8) mottles; weak fine prismatic structure; firm; shiny faces on peds; neutral.

The solum is 40 to about 50 inches thick. Except where limed, the upper 40 inches is strongly acid or very strongly acid. Clay content of the 10 to 40 inch control section is 60 to 85 percent. It is mostly 60 to 70 percent.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. It is silty clay loam, silty clay, or clay. The Bg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. It is clay or rarely silty clay. Mottles of brown and yellow are few to common. The Cg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. This horizon is dominantly clay and is silty clay in places. It is slightly acid to neutral.

Baldwin series

The Baldwin series consists of deep, poorly drained, very slowly permeable soils that formed in loamy alluvium on flat-topped terraces or low natural levees. Slopes are 0 to 2 percent.

Baldwin soils are similar to Roellen and Sharkey soils and are commonly adjacent to Crowley soils on the landscape. Roellen soils have a mollic epipedon. Sharkey soils have more than 60 percent clay and do not have an argillic horizon. Crowley soils have a silt loam A horizon and are more acid.

Typical pedon of Baldwin silty clay loam, 1,620 feet north and 320 feet west of SE corner of Sec. 8, T. 21 N., R. 9 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silty clay loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; firm; slightly acid; abrupt smooth boundary.

B21tg—7 to 12 inches; dark gray (10YR 4/1) silty clay loam; few fine distinct dark yellowish brown (10YR 4/4) mottles; weak fine angular blocky structure;

firm; few fine roots; slightly acid; abrupt smooth boundary.

B22tg—12 to 24 inches; dark gray (10YR 4/1) silty clay; few fine faint grayish brown and few fine distinct light olive brown (2.5Y 5/4) mottles; moderate fine prismatic structure; firm; few dark coatings on most vertical faces of peds; common shiny faces on peds; few fine roots; few fine dark concretions (Fe and Mn oxides); neutral; clear smooth boundary.

B23tg—24 to 43 inches; olive gray (5Y 5/2) silty clay; few fine faint light olive brown mottles; weak medium prismatic structure; firm; old root channels filled with clay; few fine calcium carbonate concretions; most faces of peds are shiny; dark gray (10YR 4/1) clay films along major vertical peds; few fine roots; few fine dark concretions (Fe and Mn oxides); mildly alkaline; clear smooth boundary.

B3tg—43 to 53 inches; olive gray (5Y 5/2) silty clay loam; faces of some peds are dark gray (10YR 4/1); few fine faint olive mottles; weak angular blocky structure parting to weak medium subangular blocky; firm; few fine calcium carbonate concretions; common shiny faces of peds; few clay films in old root channels; few soft dark concretions (Fe and Mn oxides); mildly alkaline; abrupt smooth boundary.

C1g—53 to 58 inches; olive gray (5Y 5/2) silty clay loam; common fine and medium prominent strong brown (7.5YR 5/6) and few fine faint light olive brown mottles; massive; firm; black web-like stains in old channels; few soft dark accumulations (Fe and Mn oxides); moderately alkaline; abrupt smooth boundary.

C2g—58 to 63 inches; olive gray (5Y 5/2) silty clay; few fine prominent yellowish brown (10YR 5/6) mottles; massive; few black web-like stains; few soft dark accumulations (Fe and Mn oxides); moderately alkaline; clear smooth boundary.

The solum is 40 to about 60 inches thick.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2. It is dominantly silty clay loam but ranges to silt loam. It is slightly acid to strongly acid.

The B horizon has hue of 10YR to 5Y, value of 4 or 5, and chroma of 1 or 2. It is silty clay loam or silty clay. Most pedons have few calcium carbonate concretions in the middle or lower parts of the B horizon, which typically becomes more alkaline with depth. The B horizon is medium acid to slightly acid in the upper part and slightly acid to moderately alkaline in the lower part.

The C horizon has hue of 10YR to 5Y, value of 5 or 6, and chroma of 1 or 2. It ranges from silt loam to silty clay. The C horizon is slightly acid to mildly alkaline.

Beulah series

The Beulah series consists of deep, somewhat excessively drained soils that formed in loamy alluvium. These soils are on convex ridges and in concave drainageways on natural levees. They have moderately rapid permeability. Slopes are 0 to 5 percent.

Beulah soils are similar to Bosket and Malden soils. Bosket soils have an argillic horizon and have fine-loamy texture. Malden soils are sandier and generally are in convex positions.

Typical pedon of Beulah fine sandy loam, 0 to 2 percent slopes, 1,746 feet north and 500 feet east of the center of Sec. 10, T. 21 N., R. 10 E.

Ap—0 to 7 inches; dark brown (10YR 4/3) fine sandy loam; weak medium granular structure; very friable; few fine roots; medium acid; clear smooth boundary.

B21—7 to 17 inches; dark yellowish brown (10YR 4/4) fine sandy loam; dark brown (7.5YR 4/4) coatings on faces of peds; weak fine subangular blocky structure; very friable; few fine roots; strongly acid; clear smooth boundary.

B22—17 to 35 inches; dark brown (7.5YR 4/4) fine sandy loam; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) faces of peds; few fine faint pale brown mottles at contact of B22 and C1 horizons; weak fine subangular blocky structure; very friable; few fine roots; medium acid; abrupt smooth boundary.

C1—35 to 48 inches; yellowish brown (10YR 5/4) loamy fine sand; single grain; few fine roots; medium acid; clear smooth boundary.

C2—48 to 60 inches; dark yellowish brown (10YR 4/4) loamy fine sand; common fine faint brown (10YR 5/3) mottles; single grain; medium acid.

The solum is about 30 to 50 inches thick. Beulah soils are medium acid to strongly acid except where limed.

The A horizon has value of 3 or 4 and chroma of 2 or 3. It is loamy fine sand, fine sandy loam, or sandy loam.

The B horizon has hue of 10YR and 7.5YR, commonly has value that ranges from 4 to 6, and chroma of 4. It is fine sandy loam or loam. Mottles in shades of brown are in the B horizon.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is loamy fine sand or sand. The C horizon has grayish brown or brown mottles.

Bosket series

The Bosket series consists of deep, well drained, moderately permeable soils that formed in loamy material. These soils are in drainageways and on flats and ridges of natural levees. Slopes are 0 to 2 percent.

Bosket soils are in landscape positions with Beulah, Dubbs, Broseley, and Malden soils. Beulah soils are coarse-loamy and lack an argillic horizon. Dubbs soils have a fine-silty B2t horizon and contain less sand than the Bosket soils. Broseley soils have sandy upper horizons over a loamy argillic horizon. Malden soils are

sandy throughout and lack an argillic horizon. Bosket soils are typically in lower positions on the landscape than Broseley and Malden soils.

Typical pedon of Bosket fine sandy loam, about 1,815 feet east and 500 feet north of the SW corner of Sec. 5, T. 19 N., R. 10 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) fine sandy loam, brown (10YR 5/3) dry, weak fine granular structure; very friable; few fine roots; slightly acid; abrupt smooth boundary.

A3—9 to 18 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine subangular blocky structure; friable; few fine roots; medium acid; clear smooth boundary.

B21t—18 to 31 inches; dark brown (7.5YR 4/4) sandy loam; dark yellowish brown (10YR 4/4) coatings on peds; weak fine and medium subangular blocky structure; friable; few fine roots; few thin patchy clay films; medium acid; abrupt smooth boundary.

B22t—31 to 39 inches; dark brown (7.5YR 4/4) clay loam; dark yellowish brown (10YR 4/4) coatings on faces of peds; moderate fine subangular blocky structure; firm; few thin patchy clay films; medium acid; clear smooth boundary.

B23t—39 to 50 inches; dark brown (7.5YR 4/4) sandy clay loam; weak fine subangular blocky structure; friable; few thin patchy clay films; medium acid; clear smooth boundary.

C—50 to 62 inches; yellowish brown (10YR 5/4) loamy fine sand; very weak fine granular structure; friable; slightly acid.

The solum is 30 to about 50 inches thick. The epipedon is 8 to 12 inches thick. The reaction ranges from slightly acid to strongly acid. Where limed or irrigated, the reaction commonly ranges to mildly alkaline. The A horizon has value of 3 and chroma of 2 or 3. The A3 horizon has value of 3 to 5 and chroma of 4, or value of 5 and chroma of 3 or 4. The A3 horizon is absent in some pedons.

The B2 horizon has hue of 10YR and 7.5YR, value of 4, and chroma of 4. It is sandy loam, sandy clay loam, and clay loam.

The C horizon has hue of 10YR and 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is fine sandy loam to sand.

Broseley series

The Broseley series consists of deep, well drained and somewhat excessively drained soils that formed in alluvium. These soils are on convex, sandy, natural levees. Permeability is moderately rapid. Slopes are 2 to 5 percent.

Broseley soils are similar to Bosket soils and are commonly adjacent to Bosket and Malden soils. Bosket soils are loamy throughout. Malden soils are sandy throughout and lack an argillic horizon. In addition, Broseley soils generally are in higher positions on the landscape and are more sloping than the Bosket soils.

Typical pedon of Broseley loamy fine sand, 2 to 5 percent slopes, 1,400 feet east and 1,000 feet north of SW corner of Sec. 3, T. 20 N., R. 10 E.

Ap—0 to 10 inches; dark brown (10YR 3/4) loamy fine sand, light yellowish brown (10YR 6/4) dry; weak fine granular structure; very friable; few fine roots; neutral; clear smooth boundary.

A2—10 to 32 inches; dark brown (7.5YR 4/4) loamy fine sand; weak fine subangular and weak fine granular structure; very friable; few fine roots; medium acid; clear smooth boundary.

B21t—32 to 37 inches; dark yellowish brown (10YR 4/4) sandy clay loam; dark brown (10YR 4/4) faces of peds; weak fine subangular blocky structure parting to weak very fine subangular blocky; friable; few thin patchy clay films; few roots; medium acid; clear smooth boundary.

B22t—37 to 49 inches; dark yellowish brown (10YR 4/4) sandy clay loam; dark brown (7.5YR 4/4) interiors; common fine faint pale brown (10YR 6/3) mottles; weak fine subangular blocky structure; firm; few fine roots; few soft dark accumulations (Fe and Mn oxides); thin patchy clay films; strongly acid; abrupt smooth boundary.

B23t—49 to 56 inches; dark brown (7.5YR 4/4) fine sandy loam; weak fine subangular blocky structure; friable; few patchy clay films; medium acid; clear smooth boundary.

C—56 to 66 inches; yellowish brown (10YR 5/6) loamy fine sand, few dark brown (7.5YR 4/4) lamellae 2 centimeters thick; weak fine granular structure; very friable; slightly acid.

The solum is about 40 to about 70 inches thick. Thickness of the A horizon and depth to the loamy argillic horizon range from 20 to 39 inches. The Ap horizon has value of 3 or 4 and chroma of 2 to 4. It is loamy sand or loamy fine sand. The A2 horizon has value of 3 to 5 and chroma of 3 or 4. It is loamy sand or loamy fine sand.

The B2t horizon has hue of 10YR to 5YR, value of 4 or 5, and chroma of 3 to 6. It is fine sandy loam to sandy clay loam. Some pedons have mottles with a value of 5 or 6 and chroma of 2 or 3. The B horizon is strongly acid to slightly acid.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. It is medium acid to slightly acid.

Cairo series

The Cairo series consists of deep, poorly drained, very slowly permeable over rapidly permeable soils. These soils formed in clayey alluvium over sand in abandoned, braided channels. Slopes are 0 to 2 percent.

Cairo soils are similar to Cooter soils and are commonly adjacent to Roellen and Sikeston soils. Cooter soils have a thinner solum. Roellen soils are fine textured and do not have a IIC horizon within 40 inches of the surface. Sikeston soils have fine-loamy texture.

Typical pedon of Cairo silty clay, 15 feet west and 30 feet south of center of Sec. 27, T. 18 N., R. 9 E.

Ap—0 to 10 inches; black (10YR 2/1) silty clay; weak fine subangular blocky structure; firm; common fine roots; neutral; abrupt smooth boundary.

B2—10 to 35 inches; black (10YR 2/1) silty clay; few fine prominent olive (5Y 5/4) mottles; moderate fine prismatic structure breaking to weak fine subangular blocky; firm, few fine dark concretions (Fe and Mn oxides); few fine roots; few slickensides; neutral; abrupt smooth boundary.

IIC1g—35 to 44 inches; dark gray (2.5Y 4/0) loamy sand; few fine distinct grayish brown (2.5Y 5/2) mottles; vertical streaks of black (10YR 2/1) silty clay; single grain; very friable; few roots; neutral; clear smooth boundary.

IIC2g—44 to 60 inches; brown (10YR 4/3) loamy sand; few fine distinct olive brown (2.5Y 4/4) and common fine distinct grayish brown (10YR 5/2) mottles; single grain; very friable; neutral.

Solum depth to the sandy IIC horizon is 30 to 40 inches. Reaction ranges from slightly acid to mildly alkaline throughout. Thickness of the mollic epipedon is 22 to 35 inches. The A horizon has value of 2 or 3 and chroma of 1 or 2. It is silty clay or clay.

The B2 horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1. It is silty clay or clay and has 40 to 60 percent clay. Some pedons have mottles in shades of gray, olive, and brown.

The B3g horizon, where present, is heavy silty clay loam or silty clay loam and has a smooth lower boundary. A silty clay or clay B3g horizon has an abrupt lower boundary. The B3 horizon has hue of 10YR to 5Y, value of 4 or 5, and chroma of 1 or 2.

The IICg horizon has hue of 10YR to 5Y, value of 3 to 6, and chroma of 1 to 3. Some pedons have a IIC horizon of neutral hue and are loamy sand or sand. Mottles are in shades of gray, brown, and olive.

Calhoun series

The Calhoun series consists of deep, poorly drained, slowly permeable soils that formed in silty alluvium on terraces or in slight depressions. Slopes are 0 to 2 percent.

Calhoun soils are adjacent to Crowley, Dubbs, Foley, and Lafe soils. Crowley soils are at slightly lower elevations than Calhoun soils and have a fine textured argillic horizon. Dubbs soils are on convex knobs and ridges and are well drained. Sodium is present in Foley and Lafe soils.

Typical pedon of Calhoun silt loam, 1,800 feet south and 60 feet west of NE corner of Sec. 8, T. 22 N., R. 9 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; few fine dark concretions (Fe and Mn oxides); common fine roots; very strongly acid; abrupt smooth boundary.

A21g—6 to 10 inches; grayish brown (10YR 5/2) silt loam; few fine faint light brownish gray and few fine distinct dark yellowish brown (10YR 4/4) mottles; very weak fine subangular blocky structure; friable; few fine dark concretions (Fe and Mn oxides); few roots; medium acid; abrupt smooth boundary.

A22g—10 to 13 inches; light gray (10YR 7/1) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak platy structure; slightly hard, friable; few fine dark concretions (Fe and Mn oxides); few roots; medium acid; abrupt irregular boundary.

B&A—13 to 29 inches; grayish brown (10YR 5/2) silty clay loam; compound weak prismatic structure parting to weak medium subangular blocky; firm; dark grayish brown (10YR 4/2) clay films on most vertical faces of peds (Bt). Light gray (10YR 7/1) silt loam tongues, pockets, and discontinuous tongues of A2 material make up about 15 percent of the horizon; few fine dark concretions (Fe and Mn oxides); few fine roots; strongly acid; abrupt smooth boundary.

B21tg—29 to 43 inches; light brownish gray (2.5Y 6/2) silty clay loam; few fine distinct yellowish brown (10YR 5/6 and 5/8) mottles; discontinuous tongues and pockets of light gray (10YR 7/1) silt loam make up about 5 to 10 percent of horizon; compound moderate prismatic structure parting to weak fine subangular blocky; firm; silt coatings line major vertical structure faces; grayish brown (10YR 5/2) clay films on most peds; few fine dark concretions (Fe and Mn oxides); few fine roots; very strongly acid; clear smooth boundary.

B22tg—43 to 51 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine distinct yellowish brown (10YR 5/6 and 5/8) mottles; weak fine prismatic structure; slightly hard; firm; few light gray (10YR 7/1) silt coatings and pockets along major vertical structure faces; few clay films; few fine dark accumulations (Fe and Mn oxides); few fine roots; strongly acid; clear smooth boundary.

B3g—51 to 58 inches; grayish brown (2.5Y 5/2) silt loam; few fine light gray silt coatings on some peds, black (10YR 2/1) web-like stains on faces of peds; weak prismatic structure; firm; few old roots; neutral; abrupt smooth boundary.

Cg—58 to 66 inches; grayish brown (10YR 5/2) silt loam; few fine faint yellowish brown (10YR 5/6 and 5/8) mottles; massive; friable; mildly alkaline.

The solum is 40 to about 70 inches thick, but typically is about 48 to 66 inches. The Ap or A1 horizon has value of 4 and 5 and a chroma of 2 or 3. It is medium acid to very strongly acid, except where limed. The A2 horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is medium acid to very strongly acid except where limed. Combined thickness of the A horizon ranges from 13 to 24 inches. A2 horizon material, occurring as tongues, interfingers, and coatings in pores and crayfish holes, are throughout the B horizon.

The A part of the B&A horizon has the same characteristics as the A2 horizon. The Bt part of the B&A horizon and the B2tg horizon have hue of 10YR and 2.5Y, value of 5 or 6, and chroma of 1 or 2. Mottles are shades of brown, yellow, and gray. The B2tg horizon is typically silty clay loam, but ranges to silt loam. It is strongly acid or very strongly acid, and in places is neutral in the lower part of the B horizon.

The Cg horizon has hue of 10YR and 2.5Y, value of 5 or 6, and chroma of 1 or 2. It is mildly alkaline to strongly acid.

Canalou series

The Canalou series consists of deep, moderately well drained soils that have moderately rapid permeability. These soils formed on ridges and drains of natural levees in sandy and loamy alluvium. Slopes are 0 to 2 percent.

Canalou soils are similar to Beulah and Malden soils and are adjacent to Farrenburg and Lilbourn soils. Beulah soils are somewhat excessively drained and Malden soils are excessively drained. Farrenburg soils have an argillic horizon and have fine-loamy texture. Lilbourn soils are somewhat poorly drained and are in lower positions on the landscape.

Typical pedon of Canalou loamy fine sand, 1,250 feet west and 1,000 feet north of the SE corner of Sec. 33, T. 19 N., R. 9 E.

Ap—0 to 9 inches; dark brown (7.5YR 3/2) loamy fine sand, brown (10YR 5/3) dry; weak fine granular structure; very friable; few fine roots; neutral; abrupt smooth boundary.

B1—9 to 24 inches; dark brown (7.5YR 4/4) loamy fine sand; common fine faint yellowish brown (10YR 5/4) mottles; very weak fine subangular blocky structure; very friable; few fine roots; few fine dark concretions (Fe and Mn oxides); slightly acid; clear smooth boundary.

B22—24 to 39 inches; dark yellowish brown (10YR 4/4) fine sandy loam; common fine and medium distinct light brownish gray (10YR 6/2) and dark brown (7.5YR 4/4) mottles; very weak medium subangular blocky structure parting to very fine subangular blocky; very friable; few fine roots; few fine and medium soft accumulations (Fe and Mn oxides); medium acid; abrupt smooth boundary.

B23—39 to 45 inches; dark yellowish brown (10YR 4/4) loamy fine sand; common medium distinct light brownish gray (10YR 6/2) mottles; very weak fine subangular blocky structure; very friable; few fine dark concretions (Fe and Mn oxides); medium acid; clear smooth boundary.

C1—45 to 56 inches; dark yellowish brown (10YR 4/4) sand; common fine and medium distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/4 and 5/6) mottles; single grain; loose; few fine dark concretions (Fe and Mn oxides); medium acid; clear smooth boundary.

C2—56 to 70 inches; brown (10YR 5/3) loamy sand; common fine distinct light brownish gray (10YR 6/2) and few fine faint pale brown (10YR 6/3) mottles; single grain; very friable; common fine and medium dark concretions (Fe and Mn oxides); slightly acid.

The thickness of the solum is about 36 to 50 inches. The A horizon has value of 3 and chroma of 2 or 3. It has a value of 5.5 or more when dry. Reaction is medium acid to neutral. The surface layer is loamy sand, fine sand, or loamy fine sand.

The B1 horizon has hue of 10YR and 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is loamy sand, loamy fine sand, or fine sandy loam. In some pedons the B1 horizon has mottles with value of 5 or 6 and chroma of 3 to 6. It is strongly acid to slightly acid. The B2 horizon has hue of 10YR and 7.5YR, value of 4 to 6, and chroma of 3 to 6. Mottles have value of 4 to 6 and chroma of 2 or 3. The B2 horizon commonly is fine sandy loam, loamy fine sand, or loamy sand. It is slightly acid to strongly acid.

The C horizon has hue of 10YR and 7.5YR, value of 4 to 6, and chroma of 3 or 4. Mottles are in shades of brown and gray. The C horizon is sand or loamy sand, and is medium acid to neutral.

Collins series

The Collins series consists of deep, moderately well drained, moderately permeable soils along local drainageways. A few areas of these soils are along the St. Francis River. These soils formed in silty alluvium derived from loess, and some areas still receive fresh deposits. Slopes are 0 to 2 percent.

Collins soils are similar in position to Falaya soils, and both have similar parent material. Collins soils are adjacent to Loring and Memphis soils. Falaya soils are somewhat poorly drained and are in broader, lower, and wetter natural drainageways. Loring and Memphis soils are on nearby upland positions.

Typical pedon of Collins silt loam, 1,700 feet south and 200 feet west of the center of Sec. 27, T. 22 N., R. 9 E.

Ap—0 to 6 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable; many fine roots; common fine pores; few fine dark concretions (Fe and Mn oxides); very strongly acid; abrupt smooth boundary.
C1—6 to 11 inches; dark brown (10YR 4/3) silt loam; massive with bedding planes and few brown (10YR 5/3) and pale brown (10YR 6/3) horizontal strata; very friable; common fine roots; few fine pores; very strongly acid; abrupt smooth boundary.
C2—11 to 18 inches; dark yellowish brown (10YR 4/4) silt loam; few fine distinct light brownish gray (10YR 6/2) mottles; massive with bedding planes and horizontal strata; very friable; few fine roots; few fine pores; few fine dark concretions (Fe and Mn oxides); very strongly acid; clear smooth boundary.
C3—18 to 29 inches; dark yellowish brown (10YR 4/4) silt loam; common fine and medium distinct light brownish gray (10YR 6/2) and few fine faint brown mottles; massive with bedding planes and horizontal strata; very friable; few fine pores; few soft accumulations and few dark concretions (Fe and Mn oxides); strongly acid; abrupt smooth boundary.
C4—29 to 50 inches; grayish brown (10YR 5/2) silt loam; common fine distinct dark brown (7.5YR 4/4) mottles; massive; few weakly expressed strata; friable; common fine dark concretions (Fe and Mn oxides); strongly acid; clear smooth boundary.
C5g—50 to 64 inches; gray (10YR 6/1) silt; few fine distinct pale brown (10YR 6/3) mottles; massive; common fine dark concretions (Fe and Mn oxides); strongly acid.

Bedding planes are evident below the plow layer. Reaction is strongly acid or very strongly acid except where limed. Texture is silt loam or silt throughout. The A horizon has value of 4 and chroma of 2 or 3.

The C1 horizon has value that is dominantly 4 but ranges from 3 to 5 and has chroma of 3 or 4. The C2 horizon has value of 3 to 5 and chroma of 3 or 4. It has few to common mottles with value of 6 and chroma of 2 or 3. The C3 horizon is pale brown to dark yellowish brown with gray mottles or has a matrix of 2 chromas with brown mottles. The C4 horizon and C5g horizon have value of 5 to 7 and chroma of 1 or 2.

Cooter series

The Cooter series consists of deep, moderately well drained soils that have slow over rapid or very rapid permeability. These soils formed in clayey over sandy alluvium in concave drainageways. Slopes are 0 to 2 percent.

Cooter soils are similar to Cairo soils and are commonly adjacent to Alligator and Sharkey soils on the landscape. Alligator, Cairo, and Sharkey soils have a B horizon.

Typical pedon of Cooter silty clay, about 1,900 feet west and 30 feet south of the NE corner of Sec. 31, T. 18 N., R. 10 E.

Ap—0 to 12 inches; very dark grayish brown (10YR 3/2) silty clay; weak fine granular structure; firm; slightly acid; abrupt smooth boundary.
IIC1—12 to 31 inches; brown (10YR 5/3) sand; few fine and medium faint grayish brown (10YR 5/2) mottles; single grain; loose; slightly acid; clear smooth boundary.
IIC2—31 to 60 inches; dark yellowish brown (10YR 4/4) sand; common fine and medium faint grayish brown (10YR 5/2) mottles; single grain; loose; slightly acid.

Thickness of the A horizon and depth to sandy IIC horizon is 12 to 20 inches. The soil is medium acid to neutral throughout. The A horizon has value of 2 or 3 and chroma of 1 to 3. It is commonly silty clay but also is clay and silty clay loam. Most pedons have some sand in the surface layer, but it is less than 30 percent. Some pedons have an A12 horizon.

The IIC horizon has value of 4 or 5 and chroma of 1 to 4 with grayish or brownish mottles. It is loamy fine sand, loamy sand, or sand. Some areas have thin strata of finer texture.

Crowley series

The Crowley series consists of deep, somewhat poorly drained, very slowly permeable soils on low convex ridges and in broad depressions or basins. These soils formed in silty and clayey alluvium. Slopes are 0 to about 2 percent.

Crowley soils are commonly adjacent to Calhoun, Dubbs, and Foley soils. Calhoun soils are not as clayey in the B2t horizon. Dubbs soils are browner than Crowley soils and are better drained. Foley soils have a natric horizon.

Typical pedon of Crowley silt loam, 2,120 feet north and 1,370 feet west of center of Sec. 32, T. 23 N., R. 9 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; few fine faint grayish brown mottles; weak fine granular structure; very friable; few fine roots; slightly acid; abrupt smooth boundary.
A2g—8 to 19 inches; light gray (10YR 6/1) silt loam, light gray (10YR 7/1) dry; common fine and medium distinct yellowish brown (10YR 5/6 and 10YR 5/8) mottles; very weak fine subangular blocky structure; friable; few fine roots; common fine black (10YR 2/1) soft accumulations and common fine dark concretions (Fe and Mn oxides); very strongly acid; abrupt smooth boundary.
B21tg—19 to 24 inches; dark gray (10YR 4/1) silty clay; common fine prominent red (2.5YR 4/6) mottles;

moderate fine prismatic structure; firm; few patchy clay films; few fine roots; common fine dark concretions (Fe and Mn oxides); very strongly acid; clear smooth boundary.

B22tg—24 to 51 inches; grayish brown (10YR 5/2) silty clay; few fine prominent strong brown (7.5YR 5/6) and few fine faint dark grayish brown mottles; moderate fine prismatic structure; firm; common fine dark concretions (Fe and Mn oxides); strongly acid; abrupt smooth boundary.

B3g—51 to 56 inches; grayish brown (10YR 5/2) silty clay loam; common fine and medium prominent strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; firm; neutral; abrupt smooth boundary.

Cg—56 to 69 inches; grayish brown (10YR 5/2) silty clay loam; dark gray (10YR 4/1) coatings on some peds; few fine prominent strong brown (7.5YR 5/6) mottles; massive; mildly alkaline.

The solum is about 48 to 72 inches thick. Thickness of the A horizon and depth to the Bt horizon is 12 to 20 inches. The Ap and A1 horizons have value of 4 or 5 and chroma of 1 or 2. The A2g horizon has value of 5 or 6 and chroma of 1 or 2 with few to common brownish mottles. The A horizon is very strongly acid to neutral.

The B2t horizon has value of 4 to 6 and chroma of 1 or 2. Surfaces of peds are commonly dark gray or gray. The upper part of the B2t horizon has few to common red, yellowish red, or dark red mottles. The upper part of the B2t horizon is silty clay and the lower part is silty clay or silty clay loam. The B2t horizon is strongly acid or very strongly acid. The B3 horizon, where present, has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. It is silty clay or silty clay loam. The B3 and C horizons are medium acid to moderately alkaline.

The C horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is silt, silt loam, or silty clay loam.

Dubbs series

The Dubbs series consists of deep, well drained, moderately permeable soils that formed in silty alluvium. These soils are on slightly convex to flat ridges and natural levees. Slopes are 0 to 2 percent.

Dubbs soils are similar to Bosket and Farrenburg soils. Bosket soils have a darker surface layer and have a fine-loamy texture. Farrenburg soils are moderately well drained and have a fine-loamy texture.

Typical pedon of Dubbs silt loam, 1,575 feet north and 320 feet west of center of Sec. 16, T. 18 N., R. 9 E.

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

B21t—7 to 14 inches; dark brown (7.5YR 4/4) silt loam; dark brown (7.5YR 3/2) on some ped faces; weak medium subangular blocky structure parting to weak fine subangular blocky; friable; few fine roots; medium acid; clear smooth boundary.

B22t—14 to 29 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium and fine subangular blocky structure; firm; thin patchy clay films; few fine roots; medium acid; abrupt smooth boundary.

B23t—29 to 47 inches; dark brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; thin patchy clay films on peds; few fine roots; strongly acid; gradual wavy boundary.

C1—47 to 57 inches; yellowish brown (10YR 5/4) loamy fine sand; weak fine subangular blocky structure; very friable; strongly acid; clear smooth boundary.

C2—57 to 60 inches; yellowish brown (10YR 5/4) loamy sand; single grain; very friable; slightly acid.

The solum is 30 to about 50 inches thick. Reaction ranges from medium acid to strongly acid, except where limed or irrigated. The Ap horizon has value of 3 or 4 and chroma of 2 or 3. Horizons with value of 3 are less than 10 inches thick. The Ap horizon is silt loam, loam, or very fine sandy loam.

The B2t horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is silty clay loam, silt loam, or loam. Some pedons have mottles in the lower part of the B2t horizon.

The C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is very fine sandy loam to sand.

Dundee series

The Dundee series consists of deep, somewhat poorly drained soils that have moderately slow permeability. These soils are on natural levees and drainageways and formed in loamy alluvium. Slopes are 0 to 2 percent.

Dundee soils are similar to the somewhat poorly drained Lilbourn soil which does not have an argillic horizon.

Typical pedon of Dundee silt loam, 1,350 feet west and 1,150 feet north of SE corner of Sec. 9, T. 17 N., R. 9 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; weak coarse granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

B1—6 to 13 inches; grayish brown (10YR 5/2) silt loam; common fine distinct dark yellowish brown (10YR 4/4) mottles; weak fine subangular blocky structure; friable; common fine dark concretions (Fe and Mn oxides); few fine roots; strongly acid; clear smooth boundary.

B21t—13 to 27 inches; dark grayish brown (10YR 4/2) silty clay loam; few fine faint grayish brown mottles;

moderate fine subangular blocky structure; slightly firm; very dark grayish brown (10YR 3/2) clay films on ped interiors; few fine dark concretions (Fe and Mn oxides); few fine roots; very strongly acid; clear smooth boundary.

B22t—27 to 41 inches; dark grayish brown (10YR 4/2) silty clay loam; few fine faint yellowish brown and few fine distinct light olive brown (2.5Y 5/4) mottles; moderate medium subangular blocky structure; firm; very dark grayish brown (10YR 3/2) clay films in root channels and patchy on some interiors; common fine dark concretions (Fe and Mn oxides); few fine roots; strongly acid; clear smooth boundary.

B23t—41 to 48 inches; grayish brown (10YR 5/2) silty clay loam; common fine faint dark grayish brown (10YR 4/2) few fine distinct light olive brown (2.5Y 5/4) and common fine prominent yellowish red (5YR 5/6) mottles; moderate medium prismatic structure; firm; few fine dark concretions (Fe and Mn oxides); few fine roots; medium acid; clear smooth boundary.

C—48 to 66 inches; dark grayish brown (10YR 4/2) loam alternating with thin strata of grayish brown (10YR 5/2) silt loam; common fine distinct strong brown (7.5YR 5/6) and few fine faint pale brown mottles; massive; friable; few fine roots; neutral.

The solum is 27 to 66 inches thick. The A and B horizons are medium acid to very strongly acid except on surfaces that have been limed. The A horizon has value of 4 or 5 and chroma of 2. Surfaces with value of 3 are less than 7 inches thick. The A horizon is mostly silt loam or loam and includes fine sandy loam.

The B1 and B2t horizons have hue of 10YR and 2.5Y, value of 4 or 5, and chroma of 2. Mottles are in shades of brown and gray. The B1 and B2t horizons are silt loam or silty clay loam. The B3 horizon, where present, has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. The B3 horizon ranges from silt loam to silty clay loam. Mottles are in shades of brown and gray.

The C horizon has value of 5 or 6 and chroma of 1 or 2. It is silt loam or loam. The C horizon is very strongly acid to neutral.

Falaya series

The Falaya series consists of deep, somewhat poorly drained, moderately permeable soils on the more recent flood plains. These soils formed in loamy alluvium washed from loess. Slopes are 0 to 2 percent.

Falaya soils are similar to Collins soils, and are adjacent to Collins, Dundee, Loring, and Memphis soils. Collins soils have bedding planes and are moderately well drained. Dundee soils in slightly higher positions on the landscape have an argillic horizon. Loring and Memphis soils in upland positions have an argillic horizon.

Typical pedon of Falaya silt loam, 810 feet west and 80 feet south of NE corner of Sec. 35, T. 22 N., R. 9 E.

Ap—0 to 5 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable; common fine roots; few fine dark concretions (Fe and Mn oxides); medium acid; abrupt smooth boundary.

C1—5 to 10 inches; dark yellowish brown (10YR 4/4) silt loam; few fine faint grayish brown mottles; weak fine subangular blocky structure; friable; few worm casts; common fine roots; few fine dark concretions (Fe and Mn oxides); strongly acid; abrupt smooth boundary.

C2—10 to 20 inches; grayish brown (10YR 5/2) silt loam; common fine and medium faint brown (10YR 5/3) and few fine distinct dark yellowish brown (10YR 4/4) mottles; weak fine subangular blocky structure; friable; few fine roots; common fine dark concretions and soft accumulations (Fe and Mn oxides); worm holes filled with dark grayish brown silt; strongly acid; clear smooth boundary.

C3g—20 to 38 inches; light brownish gray (10YR 6/2) silt loam; common fine faint pale brown (10YR 6/3) and grayish brown (10YR 5/2) and few fine faint brown mottles; massive; friable; few fine roots; common fine dark concretions and accumulations (Fe and Mn oxides) occur as spots and streaks; very strongly acid; clear smooth boundary.

C4g—38 to 50 inches; light brownish gray (10YR 6/2) silt loam; common fine and medium distinct dark yellowish brown (10YR 4/4) and few fine and medium distinct yellowish brown (10YR 5/4) mottles; massive; friable; few fine dark concretions and soft accumulations (Fe and Mn oxides); very strongly acid; clear smooth boundary.

C5g—50 to 62 inches grayish brown (10YR 5/2) silt loam; common fine and medium faint pale brown (10YR 6/3) and brown (10YR 5/3) mottles; massive; friable; few sand grains along old channels and in small pockets; common pockets and streaks of dark concretions (Fe and Mn oxides); very strongly acid.

Depth to any buried soil is more than 20 inches. The soil is silt loam or silt throughout. It is strongly acid or very strongly acid except on surfaces that have been limed. The Ap horizon has value of 4 and chroma of 2 or 3.

The C1 and C2 horizons have value of 4 or 5 and chroma of 2 to 4. They are mottled with higher chroma. The Cg horizon has hue of 10YR and 2.5Y, value of 5 or 6, and chroma of 1 or 2. It is mottled in shades of yellow and brown.

Farrenburg series

The Farrenburg series consists of deep, moderately well drained, moderately permeable soils on natural levees. These soils formed in loamy alluvium and have slopes of 0 to 2 percent.

These soils contain more silt and less sand in their B horizon than the defined range for the Farrenburg series, but this does not alter the usefulness or behavior of the soil.

Farrenburg soils are similar to Beulah, Bosket, and Canalou soils. Beulah soils contain less clay in the B horizon. Unlike Bosket soils, Farrenburg soils have mottles in the B horizon. Canalou soils have more sand and contain less clay than Farrenburg soils.

Typical pedon of Farrenburg fine sandy loam, 2,750 feet south and 960 feet west of NE corner, Sec. 29, T. 20 N., R. 10 E.

Ap—0 to 6 inches; dark brown (10YR 3/3) fine sandy loam; weak fine granular structure; very friable; slightly acid; few fine roots; abrupt smooth boundary.

A2—6 to 12 inches; dark brown (7.5YR 4/4) fine sandy loam; weak fine subangular blocky structure; friable; medium acid; few fine roots; abrupt smooth boundary.

B1—12 to 17 inches; dark brown (7.5YR 4/4) fine sandy loam; few streaks of brown (10YR 5/3); weak fine subangular blocky structure; friable; few fine roots; few fine dark accumulations (Fe and Mn oxides); strongly acid; clear smooth boundary.

B&A—17 to 25 inches; yellowish brown (10YR 5/4) loam; dark brown (7.5YR 4/4) coatings on most peds in the B part; grayish brown (10YR 5/2) silt coatings between peds in the A part; weak fine subangular blocky structure; friable; few fine roots; few fine dark accumulations (Fe and Mn oxides); strongly acid; clear smooth boundary.

B21t—25 to 35 inches; light brownish gray (10YR 6/2) loam; common fine distinct yellowish brown (10YR 5/6) and few fine distinct dark yellowish brown (10YR 4/4) mottles; weak fine and very fine subangular blocky structure; friable; few patchy clay films; few fine roots; few fine dark accumulations (Fe and Mn oxides); strongly acid; clear smooth boundary.

B22tg—35 to 43 inches; light brownish gray (10YR 6/2) loam; common fine distinct yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; friable; few fine roots; few fine dark concretions (Fe and Mn oxides); few dark clay films; strongly acid; clear smooth boundary.

B3g—43 to 52 inches; light brownish gray (10YR 6/2) loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak fine and medium subangular blocky structure; friable; few roots; strongly acid; abrupt smooth boundary.

IIC1—52 to 59 inches; stratified light brownish gray (10YR 6/2), light yellowish brown (10YR 6/4) and dark yellowish brown (10YR 4/4) sand; single grain; slightly acid; clear smooth boundary.

IIC2—59 to 68 inches; dark brown (10YR 3/2) sand; single grain; loose; slightly acid.

The solum is about 30 to 54 inches thick. The Ap horizon has value of 3 or 4 and chroma of 3 or 4. Value is 6 or more when dry. The Ap horizon is fine sandy loam, sandy loam, or loamy sand. It is strongly acid to slightly acid. The A2 horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. It is sandy loam or fine sandy loam. The A2 horizon is strongly acid to slightly acid, except where limed or irrigated.

The B1 horizon has hue of 10YR and 7.5YR, value of 4 or 5, and chroma of 4 or 6. It is fine sandy loam or loam with gray and brownish mottles. The B1 horizon is very strongly acid and medium acid. The A2 part of the B&A horizon consists of silt coatings, skeletons, and interfingers with hue of 10YR, value of 5 or 6, and chroma of 2. The Bt part has hue of 10YR and 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is very strongly acid and medium acid. The B2t and B3 horizons have hue of 10YR and 7.5YR, value of 4 or 5, and chroma of 4 or 6 with grayish brown mottles or have value of 5 or 6 and chroma of 2 with brownish mottles. They are fine sandy loam, sandy loam, loam, sandy clay loam, clay loam, or silty clay. The B2t and B3 horizons are very strongly acid and medium acid.

The C and IIC horizons have hue of 10YR and 7.5YR, value of 4 to 6, and chroma of 2 to 8. Some pedons have gray or brown mottles. They are fine sandy loam, loamy fine sand, loamy sand, or sand. The C and IIC horizons are strongly acid to slightly acid.

Foley series

The Foley series consists of deep, poorly drained, very slowly permeable soils on broad flat terraces or natural levees. These soils formed in silty alluvium that is high in sodium or magnesium. Slopes are 0 to 2 percent.

Foley soils are similar to Lafe soils and commonly are adjacent to Calhoun, Crowley, and Dubbs soils on the landscape. Lafe soils are browner and have a natric horizon. Unlike Crowley, Dubbs, and Calhoun soils, Foley soils have a natric horizon. Crowley soils are somewhat poorly drained and have a fine textured argillic horizon. Dubbs soil are well drained, and are in higher positions on the landscape.

Typical pedon of Foley silt loam, about 1,400 feet south and 50 feet east of NW corner of Sec. 23, T. 22 N., R. 8 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; common fine roots; common fine dark concretions (Fe and Mn oxides); medium acid; abrupt smooth boundary.

A2g—7 to 11 inches; light brownish gray (10YR 6/2) silt loam; common fine faint grayish brown (10YR 5/2) mottles; weak fine granular structure; friable; few fine roots; few fine dark concretions (Fe and Mn oxides); a few peds of B horizon material in the lower part; strongly acid; abrupt irregular boundary.

B&A—11 to 18 inches; grayish brown (2.5Y 5/2) silty clay loam; few medium faint brown (10YR 5/3) and a few fine distinct yellowish brown (10YR 5/4) mottles in the B part; moderate fine prismatic structure parting to weak fine subangular blocky; light brownish gray (10YR 6/2) silt coatings 1 to 3 millimeters thick on most vertical faces; tongues of the A2 horizon extend through this horizon and make up about 30 percent of the horizon; friable; few fine roots; few fine dark concretions (Fe and Mn oxides); strongly acid; abrupt smooth boundary.

B21tg—18 to 25 inches; grayish brown (2.5Y 5/2) silty clay loam; light gray (10YR 7/1), white (10YR 8/1) dry; common fine distinct light olive brown (2.5Y 6/6) mottles; discontinuous pockets and continuous tongues of A2 horizon material make up 5 to 10 percent of the horizon; moderate fine prismatic structure; firm; black (10YR 2/1) web-like stains on major peds; clay films are patchy and on most faces of peds; moderately alkaline; clear smooth boundary.

B22tg—25 to 32 inches; olive gray (5Y 5/2) silty clay loam; few fine faint olive (5Y 5/3) and common fine prominent brown (10YR 5/3) mottles; light gray (10YR 7/1) silt coatings on most peds; moderate fine prismatic structure; firm; black (10YR 2/1) web-like stains on most vertical peds; dark clay films are patchy; few fine dark concretions (Fe and Mn oxides); strongly alkaline; clear smooth boundary.

B23tg—32 to 50 inches; olive gray (5Y 5/2) silty clay loam; common fine prominent dark yellowish brown (10YR 4/4) and brown (10YR 5/3) mottles; gray (10YR 5/1) and light gray (10YR 7/1) silt coatings, tongues and discontinuous pockets make up about 10 percent of the horizon; moderate medium prismatic structure; firm; few fine dark concretions (Fe and Mn oxides); strongly alkaline; abrupt smooth boundary.

B3tg—50 to 69 inches; olive gray (5Y 5/2) silty clay loam; common fine and medium distinct light olive brown (2.5Y 5/4) mottles; moderate fine prismatic structure; firm; few white concretions (calcium carbonate); slight effervescence; black (10YR 2/1) web-like stains on most peds; strongly alkaline; gradual smooth boundary.

Cg—69 to 71 inches; light brownish gray (2.5Y 6/2) silt; common fine distinct yellowish brown (10YR 5/4) and few fine faint light olive brown mottles; massive; firm; few white concretions (CaCO3); strongly alkaline.

The solum is about 45 to 72 inches thick. The natric horizon is within 7 to 16 inches of the upper boundary of the B horizon. The Ap horizon has value of 4 and chroma of 2. The Ap or A1 horizons have chroma of 3 where the value is 3. The A2 horizon has value of 5 or 6 and chroma of 1 or 2. It is silt loam or silt. The A horizon is very strongly acid to medium acid except where limed.

The B horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2. It is silty clay loam. Mottles are in shades of brown and gray. Some pedons have a B1 horizon.

The B1 and B21 horizons are strongly acid to neutral. The B22 and B3 horizons range from neutral to strongly alkaline. The B3 horizon is silty clay loam or silt loam.

Fountain series

The Fountain series consists of deep, poorly drained soils with moderately slow permeability that formed in loamy alluvium. These soils are on natural levees and terraces. Slopes are 0 to 2 percent.

Fountain soils are similar to Foley soils and are generally adjacent to Foley and Falaya soils on the landcape. Foley soils have a natric horizon. Unlike Falaya soils, Fountain soils have an argillic horizon, and Falaya soils are lower on the landscape.

Typical pedon of Fountain silt loam, 1,500 feet west and 990 feet north of the center of Sec. 20, T. 21 N., R. 9 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; medium acid; abrupt smooth boundary.

A2g—6 to 12 inches; light brownish gray (10YR 6/2) silt loam; common fine distinct yellowish brown (10YR 5/6 and 5/8) mottles; weak fine subangular blocky structure; friable; medium acid; abrupt smooth boundary.

B&A—12 to 22 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine distinct yellowish brown (10YR 5/6 and 5/8) mottles; moderate fine prismatic structure; firm in the B part; light brownish gray (10YR 6/2) tongues and pockets of silt in the A part; makes up about 15 percent of the horizon; few fine dark soft accumulations (Fe and Mn oxides); clay films on most vertical faces; neutral; clear smooth boundary.

B2tg—22 to 35 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine faint dark grayish brown (10YR 4/2) and common fine distinct yellowish brown (10YR 5/6 and 5/8) mottles; compound moderate fine prismatic structure parting to weak medium subangular blocky; common silt coatings and pockets of light brownish gray silt loam A2 material; firm; few dark concretions (Fe and Mn oxides); mildly alkaline; clear smooth boundary.

B3g—35 to 48 inches; grayish brown (10YR 5/2) silt loam; common fine faint dark brown (10YR 4/3) and common fine distinct dark yellowish brown (10YR 4/4) mottles; compound weak fine prismatic structure parting to weak medium subangular blocky; firm; few dark concretions (Fe and Mn oxides); mildly alkaline; gradual smooth boundary.

Cg—48 to 62 inches; grayish brown (2.5Y 5/2) silt loam; common fine distinct yellowish brown (10YR 5/6 and 5/8) mottles; weak fine prismatic structure; friable; moderately alkaline.

The solum is about 40 to 60 inches or more thick and commonly is more than 48 inches. The Ap or A1 horizon has value of 4 and chroma of 2 or 3. It is silt loam and medium acid to neutral. The A2 horizon has hue of 2.5Y and 10YR, value of 5 or 6, and chroma of 1 or 2. It is silt loam and extends into the Bt horizon. The A2 horizon is medium acid to mildly alkaline.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. It is silt loam or silty clay loam, and neutral to mildly alkaline. Mottles are in shades of brown or gray. The B3 horizon, where present, and the C horizon have hue of 10YR to 5Y, value of 5 or 6, and chroma of 1 or 2. They are silt loam or silty clay loam and are neutral to moderately alkaline.

Gideon series

The Gideon series consists of deep, poorly drained soils in basins, in drainageways, and on low natural levees. These soils formed in loamy alluvium. Permeability is moderately slow. Slopes are 0 to 2 percent.

Gideon soils are similar to Wardell soils and are commonly adjacent to Cairo, Lilbourn, Roellen, and Sharkey soils in the landscape. Cairo and Roellen soils have a mollic epipedon and more clay. Sharkey soils also have more clay. Wardell soils have an argillic horizon and are more acid than Gideon soils.

Typical pedon of Gideon loam, about 500 feet west and 840 feet south of center of Sec. 1, T. 17 N., R. 9 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak medium granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

C1g—8 to 14 inches; dark gray (10YR 4/1) clay loam; common fine distinct strong brown (7.5YR 5/6) and few fine distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; firm; few fine roots; few fine dark concretions (Fe and Mn oxides); few pockets of sand; neutral; clear smooth boundary.

C2g—14 to 30 inches; dark gray (10YR 4/1) clay loam; few fine prominent mottles of yellowish red (5YR 4/6); weak fine subangular blocky structure; firm; few fine roots; few fine concretions (Fe and Mn oxides); slightly acid; gradual smooth boundary.

C3g—30 to 48 inches; gray (5Y 5/1) clay loam; few fine prominent reddish brown (5YR 4/4) mottles; moderate fine and medium subangular blocky structure; firm; greenish gray (5G 5/1) along root channels; few fine concretions (Fe and Mn oxides); slightly acid; abrupt smooth boundary.

C4g—48 to 69 inches; gray (5Y 5/1) loam; greenish gray (5G 5/1) along root channels; common fine distinct mottles of yellowish brown (10YR 5/6) strong brown (7.5YR 5/6) around concretions; massive; friable; few large dark concretions (Fe and Mn oxides); slightly acid; abrupt smooth boundary.

IIC5—69 to 73 inches; dark gray (10YR 4/1) and yellowish brown (10YR 5/4) loamy sand; single grain; loose; slightly acid.

Reaction ranges from slightly acid to moderately alkaline. The A horizon has value of 3 and chroma of 1 to 3. It is loam, clay loam, or rarely sandy loam.

The Cg horizon has hue of 10YR, 2.5Y, or 5Y; value of 4 to 6; and chroma of 2 or less. Faint to prominent mottles are present in most pedons. The Cg horizon is loam, sandy clay loam, or clay loam. The IIC horizon, where present, is generally brown or gray loamy sand.

Jackport series

The Jackport series consists of deep, poorly drained, very slowly permeable soils that formed in loamy and clayey alluvium. These soils are in concave drainageways and depressions. Slopes are 0 to 2 percent.

Jackport soils are similar to Alligator soils and are commonly adjacent to Crowley, Dubbs, and Foley soils. Alligator soils are grayer and lack an argillic horizon. Crowley soils have a silt loam A horizon and are in slightly higher positions on the landscape. Dubbs soils are browner, have less clay, and are in higher positions. Foley soils have a natric horizon and are in slightly higher positions on the landscape than the Jackport soils.

Typical pedon of Jackport silty clay loam, about 4,000 feet south and 450 feet west of NE corner of Sec. 32, T. 22 N., R. 8 E.

Apl—0 to 5 inches; dark grayish brown (10YR 4/2) silty clay loam; weak fine angular blocky structure; firm; few fine roots; few fine dark concretions (Fe and Mn oxides); medium acid; abrupt smooth boundary.

Ap2—5 to 9 inches; dark grayish brown (10YR 4/2) silty clay loam; pockets of gray (5Y 5/1) and common fine distinct dark yellowish brown (10YR 4/4) mottles; weak fine angular blocky structure; firm; few fine roots; few fine dark concretions (Fe and Mn oxides); medium acid; abrupt smooth boundary.

B21tg—9 to 26 inches; grayish brown (10YR 5/2) silty clay; few fine faint dark brown (10YR 4/3) mottles; weak prismatic structure; firm; few dark coatings on some peds; few shiny faces on peds; few fine roots; few fine dark concretions (Fe and Mn oxides); strongly acid; clear smooth boundary.

B22tg—26 to 55 inches; grayish brown (2.5Y 5/2) clay; greenish gray (5G 5/1) around roots; few fine distinct dark brown (10YR 4/3) mottles; weak prismatic

structure; firm; few dark coatings on some peds; few shiny faces on peds; few fine roots; few fine dark concretions (Fe and Mn oxides); very strongly acid; clear smooth boundary.

B3g—55 to 65 inches; olive gray (5Y 5/2) silty clay loam; common fine prominent dark yellowish brown (10YR 4/4) mottles; compound moderate prismatic structure parting to weak fine subangular blocky; firm; streaks and pockets of soft oxides and dark concretions (Fe and Mn oxides); few fine white concretions (CaCO3); neutral; clear smooth boundary.

Cg—65 to 73 inches; grayish brown (2.5Y 5/2) silt loam; common fine and medium distinct dark yellowish brown (10YR 4/4) mottles; massive; friable; streaks and pockets of dark oxides and dark concretions (Fe and Mn oxides); few fine calcium carbonate concretions; mildly alkaline.

The solum is 38 to about 65 inches thick. The Ap horizon is dark grayish brown silty clay loam and is very strongly acid to medium acid, except where limed. Some pedons have a gray or light brownish gray A2 horizon less than 6 inches thick.

The B horizon has hue of 10YR, 2.5Y, and 5Y; value of 5; and chroma of 2. It is mottled in shades of brown. The B21 horizon is silty clay or clay, the B22 horizon is clay, and the B3 horizon is silty clay or silty clay loam. The B horizon is very strongly acid or strongly acid, except in some pedons where the lower part ranges to mildly alkaline.

The C horizon has hue of 10YR, 2.5Y or 5Y; value of 5; and chroma of 2. It is silt loam or silty clay loam and slightly acid to mildly alkaline.

Lafe series

The Lafe series consists of deep, somewhat poorly drained, very slowly permeable soils that are high in sodium. These soils formed in loamy alluvium on slightly convex to flat terraces known locally as "post-oak flats" or "alkali." Slopes are 0 to 2 percent.

Lafe soils are similar to Foley soils and are commonly adjacent to Crowley, Dubbs, and Foley soils. Foley soils are acid in upper horizons that are over an alkaline Bt horizon, and are poorly drained. Unlike Lafe soils, Crowley and Dubbs soils are acid and lack a natric horizon.

Typical pedon of Lafe silt loam, 42 feet west and 480 feet south of NE corner Sec. 24, T. 22 N., R. 8 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; slightly acid; abrupt smooth boundary.

B21t—6 to 14 inches; yellowish brown (10YR 5/4) silty clay loam; few fine faint brown (10YR 5/3) and common fine faint grayish brown (10YR 5/2) mottles; compound medium prismatic structure parting to moderate medium subangular blocky; firm; light brownish gray (10YR 6/2) silt coatings and tongues between prisms; few dark brown (10YR 3/3) clay films; few fine roots; few fine dark concretions (Fe and Mn oxides); moderately alkaline; gradual wavy boundary.

B22t—14 to 24 inches; brown (10YR 5/3) silty clay loam; few fine faint grayish brown mottles; moderate fine prismatic structure; firm; black (10YR 2/1) web-like stains; dark yellowish brown (10YR 4/4) clay films; light brownish gray (10YR 6/2) tongues of silt loam between prisms and as discontinuous tongues; strongly alkaline; few fine dark concretions (Fe and Mn oxides); abrupt smooth boundary.

B23tg—24 to 35 inches; grayish brown (10YR 5/2) silty clay loam; common fine distinct yellowish brown (10YR 5/6 and 5/8) and few fine distinct strong brown (7.5YR 5/6) mottles; compound moderate prismatic structure parting to moderate fine subangular blocky; firm; black (10YR 2/1) stains; dark gray (10YR 4/1) clay films on most peds; few fine concretions (CaCO3); strongly alkaline; clear smooth boundary.

B3—35 to 43 inches; grayish brown (10YR 5/2) silty clay loam; few fine distinct dark yellowish brown, few fine medium distinct dark brown (7.5YR 4/4), and common fine distinct strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; firm; pockets of soft accumulations (Fe and Mn oxides); strongly alkaline; clear smooth boundary.

Cg—43 to 70 inches; grayish brown (10YR 5/2) silt loam; common fine and medium distinct strong brown (7.5YR 5/6) mottles; very dark grayish brown (10YR 3/2) stains; massive; friable; few fine concretions (CaCO3); strongly alkaline.

The solum is about 34 to 60 inches thick. Depth to the natric horizon ranges from 6 to 10 inches. The A horizon has value of 4 or 5 and chroma of 2 or 3. It is strongly acid to slightly acid. Some pedons have an A2 horizon.

The B21t horizon has value of 5 and chroma of 3 or 4. Mottles are in shades of gray and brown. The B21t horizon is silt loam or silty clay loam. Pockets, tongues, and interfingers of material from the A2 horizon are throughout the upper part of the B2t horizon, which is moderately alkaline to strongly alkaline. The B22t, B23t, and B3 horizons have hue of 10YR, value of 5, and chroma of 1 to 4. They are silty clay loam and moderately alkaline or strongly alkaline.

The C horizon is silt loam and is strongly alkaline. It has hue of 10YR, value of 5 or 6, and chroma of 1 to 3.

Lilbourn series

The Lilbourn series consists of deep, somewhat poorly drained, moderately permeable soils that formed in loamy alluvium over older buried alluvium. These soils

are on natural levees and low ridges, and are in depressional drainageways. Slopes are 0 to 2 percent.

Lilbourn soils are similar to Gideon soils and are commonly adjacent to Canalou, Dundee, Farrenburg, Gideon, and Wardell soils. Gideon soils are poorly drained and contain more clay throughout the solum. Canalou soils are moderately well drained, contain less clay throughout, and are normally higher on the landscape than the Lilbourn soils. Dundee soils have finer textures in the upper part of the solum. Farrenburg soils have an argillic horizon and are moderately well drained. Wardell soils have an argillic horizon.

Typical pedon of Lilbourn fine sandy loam, 1,300 feet east and 54 feet south of center of Sec. 33, T. 22 N., R. 10 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; friable; common fine roots; medium acid; abrupt smooth boundary.

A12—7 to 15 inches; brown (10YR 4/3) fine sandy loam; few medium faint yellowish brown (10YR 5/4 and 5/6) mottles; weak fine granular structure; friable; few fine roots; medium acid; clear smooth boundary.

C1—15 to 26 inches; grayish brown (10YR 5/2) loamy sand; few medium faint light gray (10YR 7/1) and few fine distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) mottles; weak fine granular structure; loose; common large dark concretions and accumulations of soft bodies (Fe and Mn oxides) and sand grains cemented with iron and manganese; medium acid; abrupt smooth boundary.

IIB1b—26 to 29 inches; gray (10YR 5/1) sandy loam; few fine yellowish brown (10YR 5/4) mottles; weak fine subangular blocky structure; friable; few fine dark concretions (Fe and Mn oxides); medium acid; abrupt smooth boundary.

IIB21b—29 to 38 inches; dark gray (10YR 4/1) sandy clay loam; few fine distinct yellowish brown (10YR 5/6) and few fine faint gray mottles; very weak fine subangular blocky structure; firm; slightly acid; clear smooth boundary.

IIB22b—38 to 49 inches; dark gray (10YR 4/1) sandy loam; few fine distinct yellowish brown (10YR 5/4) mottles; weak fine granular structure; friable; medium acid; clear smooth boundary.

IIC1g—49 to 57 inches; gray (10YR 5/1) loamy fine sand; few fine distinct yellowish brown (10YR 5/6) and light olive brown (2.5Y 5/4) mottles; massive; loose; neutral; clear smooth boundary.

IIC2—57 to 67 inches; brown (10YR 5/3) sand; single grain; loose; slightly acid.

The thickness of the A and C horizons and the depth to the IIB2b horizon ranges from 20 to 36 inches. The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. It is dominantly fine sandy loam or sandy loam but ranges to loam, loamy fine sand, loamy sand, and fine sand.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is sandy loam, fine sandy loam, loam, loamy sand, or loamy fine sand. Reaction ranges from medium acid to neutral.

The IIB2b horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is clay loam, sandy clay loam, or loam. Reaction ranges from medium acid to neutral. The IIC horizon has hue of 10YR, value of 5 or 6, and chroma of 1 to 8. It is loamy sand, loamy fine sand, or sand. Reaction is strongly acid to neutral.

Loring series

The Loring series consists of deep, moderately well drained soils on loess-covered uplands. These soils formed in loess deposits more than four feet thick. Permeability is moderate over moderately slow. Slopes are 2 to 14 percent.

Loring soils are similar and adjacent to Collins, Falaya, and Memphis soils. The moderately well drained Collins soils and the somewhat poorly drained Falaya soils are in drainageways. Memphis soils are well drained and are on upland positions. Unlike Loring soils, the Memphis soils lack low chroma mottles.

Typical pedon of Loring silt loam, 2 to 5 percent slopes, about 1,620 feet north and 600 feet east of center of Sec. 33, T. 22 N., R. 9 E.

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; few fine roots; neutral; clear smooth boundary.

B1—7 to 11 inches; dark brown (7.5YR 4/4) silt loam; weak fine subangular blocky structure; friable; few fine roots; medium acid; clear smooth boundary.

B2t—11 to 22 inches; strong brown (7.5YR 5/6) silty clay loam; weak fine subangular blocky structure; firm; few clay films mainly along old root channels; few fine roots; strongly acid; abrupt smooth boundary.

Bx1—22 to 26 inches; yellowish brown (10YR 5/6) silty clay loam; brown (10YR 5/3) and yellowish brown (10YR 5/4) silt coatings along vertical faces; compound moderate fine prismatic structure parting to moderate fine subangular blocky; very firm; strongly acid; slightly brittle; few fine dark concretions (Fe and Mn oxides); abrupt smooth boundary.

Bx2—26 to 29 inches; yellowish brown (10YR 5/4) silty clay loam; grayish brown (10YR 5/2) and pale brown (10YR 6/3) silt coatings along vertical faces; moderate fine prismatic structure parting to moderate fine subangular blocky; very firm; continuous dark yellowish brown clay films on vertical faces and many horizontal faces; weakly expressed brittleness when moist; roots concentrated along structure weaknesses; strongly acid; abrupt smooth boundary.

Bx3—29 to 34 inches; dark yellowish brown (10YR 4/4) silty clay loam; grayish brown (10YR 5/2) silt coatings along vertical faces; compound moderate fine prismatic structure parting to moderate fine subangular blocky; few clay films; few old roots; very firm; few fine dark concretions (Fe and Mn oxides); very strongly acid; clear smooth boundary.

B3t—34 to 54 inches; dark brown (7.5YR 4/4) silt loam; common fine faint grayish brown (10YR 5/2) and brown (10YR 5/3) mottles; weak fine subangular blocky structure; few dark clay films; slightly firm; strongly acid; clear smooth boundary.

C—54 to 67 inches; dark brown (7.5YR 4/4) silt loam; few medium faint brown (10YR 5/3) mottles; massive; friable; very strongly acid.

The solum is 45 to 75 inches thick but is commonly 45 to 55 inches. Depth to the fragipan is 24 to 30 inches, but ranges from 22 to 30 inches. Reaction is medium acid to very strongly acid, except where limed. The A horizon has hue of 10YR and 7.5YR, value of 4, and chroma of 2 or 3. It is silt loam.

The B1 and B2t horizons have hue of 10YR and 7.5YR, value of 4 or 5, and chroma of 4 to 6. In some pedons the B2t horizon has mottles and is silt loam or silty clay loam. The Bxl horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. It has gray or brown mottles and is silt loam or silty clay loam.

The C horizon has hue of 10YR and 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam and mottled.

In Loring silt loam, 9 to 14 percent slopes, eroded, the fragipan is closer to the surface than in the defined range for the Loring series, but this does not alter the usefulness or behavior of this soil.

Malden series

The Malden series consists of deep, excessively drained, rapidly permeable soils that formed in sandy alluvium. These soils are on convex natural levees. Slopes are 0 to 4 percent.

Malden soils are generally adjacent to Beulah, Bosket, Broseley, and Canalou soils. Beulah soils have a fine sandy loam B horizon. Bosket and Broseley soils have an argillic horizon, and Canalou soils have mottles with chroma of 2 or less.

Typical pedon of Malden fine sand, 0 to 4 percent slopes, 420 feet north and 1,290 feet west of center of Sec. 12, T. 18 N., R. 9 E.

Ap1—0 to 4 inches; dark brown (10YR 3/3) fine sand, pale brown (10YR 6/3) dry; weak fine granular structure; very friable; few fine roots; medium acid; abrupt smooth boundary.

Ap2—4 to 10 inches; dark brown (10YR 3/4) loamy fine sand; yellowish brown (10YR 3/4) dry; weak fine granular structure; very friable; few fine roots; medium acid; abrupt smooth boundary.

B21—10 to 22 inches; dark brown (7.5YR 4/4) loamy fine sand; very weak fine and medium subangular structure; very friable; few fine roots; medium acid; clear smooth boundary.

B22—22 to 41 inches; dark yellowish brown (10YR 4/4) loamy fine sand; very weak fine subangular blocky structure; very friable; few fine roots; medium acid; clear smooth boundary.

B3—41 to 50 inches; dark yellowish brown (10YR 4/4) fine sand; single grain; slightly coherent when moist; few fine roots; medium acid; clear wavy boundary.

C—50 to 69 inches; yellowish brown (10YR 5/4) sand; single grain; loose; slightly acid.

The solum is 19 to 60 inches or more thick, but commonly is 30 to 54 inches. Reaction is slightly acid to strongly acid except where limed or irrigated. The A horizon has hue of 10YR or 7.5YR, value of 3, and chroma of 3 or 4. It is fine sand, sand, loamy sand, or loamy fine sand. Some pedons lack the Ap2 horizon.

The B21 horizon has hue of 7.5YR, value of 4 or 5, and chroma of 4 to 6. In some pedons it has hue of 5YR, value of 4, and chroma of 4. The B22 and B3 horizons have hue of 7.5YR and 10YR, value of 4 or 5, and chroma of 4 or 6. They are commonly loamy fine sand or loamy sand, but range to sand and fine sand.

The C horizon has hue of 10YR and 7.5YR, value of 4 or 5, and chroma of 4 to 6. It has brown and grayish mottles below a depth of 48 inches in some pedons, and commonly is fine sand.

Memphis series

The Memphis series consists of deep, well drained, moderately permeable soils that formed on uplands in silty loess more than four feet thick. Slopes are 5 to 30 percent.

Memphis soils are similar and adjacent to Loring soils. Loring soils are moderately well drained and have a fragipan.

Typical pedon of Memphis silt loam, 5 to 9 percent slopes, about 1,500 feet north and 450 feet east of the SW corner of Sec. 26, T. 22 N., R. 9 E.

Ap—0 to 8 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable; common fine roots; slightly acid; abrupt smooth boundary.

B1—8 to 13 inches; yellowish brown (10YR 5/6) silt loam; weak fine subangular blocky structure; friable; common fine roots; medium acid; abrupt smooth boundary.

B21t—13 to 21 inches; dark brown (7.5YR 4/4) silty clay loam; few fine dark yellowish brown (10YR 4/4) silt coatings; moderate fine and medium subangular

blocky structure; firm; few fine roots; few patchy clay films; strongly acid; clear smooth boundary.

B22t—21 to 32 inches; dark yellowish brown (10YR 4/4) silty clay loam; faces of peds dark brown (7.5YR 4/4); few fine yellowish brown (10YR 5/4) silt coatings; compound moderate prismatic structure parting to moderate fine subangular blocky; patchy clay films on most vertical faces of peds; firm; few fine roots; strongly acid; clear smooth boundary.

B23t—32 to 62 inches; dark brown (7.5YR 4/4) silty clay loam; few fine yellowish brown (10YR 5/4) silt coatings; compound moderate fine prismatic structure parting to moderate fine subangular blocky; dark brown (7.5YR 4/2) clay films on most vertical faces of peds; firm; few fine roots; very strongly acid; abrupt smooth boundary.

C—62 to 77 inches; yellowish brown (10YR 5/4) silt loam; few vertical streaks dark brown (7.5YR 4/4); massive; friable; very strongly acid.

The solum is 38 to 65 inches thick. The soil ranges from medium acid to very strongly acid except where limed. The A horizon has hue of 10YR and 7.5YR, value of 4, and chroma of 3 or 4. Where the A horizon has hue of 10YR, value of 3, and chroma of 3, it is less than 6 inches thick.

The B horizon has hue of 10YR and 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam or silty clay loam. Some pedons do not have silt coatings.

The C horizon has hue of 10YR and 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam or silt.

Roellen series

The Roellen series consists of deep, poorly drained, slowly permeable soils that formed in clayey alluvium in slack water areas of basins and drains. It is known locally as "gumbo" or "black land." Slopes are 0 to 2 percent.

Roellen soils are similar to Cairo soils and commonly are adjacent to Cairo, Gideon, and Sikeston soils. Cairo soils have a sandy IIC horizon. Gideon soils have a fine-loamy texture and a thinner epipedon. Sikeston soils have a fine-loamy texture and a mollic epipedon more than 24 inches thick.

Typical pedon of Roellen silty clay, about 1,500 feet west and 25 feet south of center of Sec. 35, T. 21 N., R. 9 E.

Ap—0 to 13 inches; very dark gray (10YR 3/1) silty clay; moderate medium angular blocky structure; firm; common fine roots; neutral; abrupt smooth boundary.

B1g—13 to 25 inches; dark gray (5Y 4/1) silty clay; common fine faint very dark gray (5Y 3/1) and common fine prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm; few shiny faces along vertical planes; few fine roots; neutral; clear smooth boundary.

B21g—25 to 36 inches; dark gray (5Y 4/1) clay; few fine distinct light olive brown (2.5Y 5/4) mottles; compound moderate prismatic structure parting to fine subangular blocky; firm; few slickensides; common shiny faces; plastic; few fine roots; neutral; clear smooth boundary.

B22g—36 to 54 inches; dark gray (10YR 4/1) silty clay with few vertical streaks of olive gray (5Y 5/2); moderate medium prismatic structure; firm; few woody fibers; few fine roots; mildly alkaline; irregular wavy boundary.

IICg—54 to 62 inches; olive gray (5Y 5/2) silt loam; few streaks of very dark gray silty clay; weak fine granular structure; friable; mildly alkaline.

The solum is 42 to 62 inches thick. These soils commonly are slightly acid or neutral throughout, but range from medium acid to mildly alkaline. Thickness of the mollic epipedon ranges from 10 to 28 inches. The A horizon has value of 3 and chroma of 1 or 2. It is commonly silty clay, but ranges to clay and silty clay loam.

The Bg horizon has hue of 10YR and 5Y, value of 4 or 5, and chroma of 1 or 2. Many pedons are neutral in color, have value of 4 or 5, and have dark stains along cracks. Slickensides and polished ped faces are few to common in the B horizon. The B horizon is silty clay or clay and has 40 to 60 percent clay. Mottles in the Bg horizon are in shades of gray, brown, or olive.

The Cg and IIC horizons have hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. Some pedons are neutral in color, have value of 4 to 6, and are silty clay, clay, clay loam, or silt loam.

Sharkey series

The Sharkey series consists of deep, poorly drained, very slowly permeable soils on broad basins in backswamp positions. These soils formed in clayey alluvium and are known locally as "gumbo." Slopes are 0 to 2 percent.

Sharkey soils are similar to Alligator soils and are commonly adjacent to Alligator, Gideon, Steele, and Wardell soils. Alligator soils are acid and are generally in slightly higher positions on the landscape. Gideon soils have a fine-loamy texture and are generally on slightly convex low natural levees. Wardell soils have a fine-loamy argillic horizon and are on slightly convex low natural levees. Steele soils have sandy upper layers and are on convex ridges.

Typical pedon of Sharkey clay, in a cultivated field 27 feet west and 50 feet south of NE corner of Sec. 6, T. 18 N., R. 10 E.

Ap—0 to 5 inches; very dark gray (10YR 3/1) clay, gray (10YR 5/1) dry; weak fine and medium granular structure; firm; many roots; medium acid; abrupt smooth boundary.

B1g—5 to 14 inches; gray (10YR 5/1) clay; few fine distinct yellowish brown mottles; moderate medium subangular blocky structure; firm; common fine roots; very dark gray (10YR 3/1) surface material lining old cracks; few shiny faces on peds; slightly acid; clear smooth boundary.

B21g—14 to 27 inches; gray (10YR 5/1) clay; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; very firm; few fine roots; few slickensides; neutral; clear smooth boundary.

B22g—27 to 38 inches; gray (10YR 5/1) clay; moderate medium subangular blocky structure; firm; few fine roots; few slickensides; mildly alkaline; clear smooth boundary.

B3g—38 to 49 inches; gray (5Y 5/1) clay; moderate fine and medium subangular blocky structure; firm; few roots; shiny faces on peds; mildly alkaline; clear smooth boundary.

C1g—49 to 57 inches; gray (5Y 5/1) clay; few fine distinct light olive brown (2.5Y 5/4) mottles; moderate fine subangular blocky structure; firm; few roots; shiny faces on peds; few slickensides; mildly alkaline; abrupt smooth boundary.

C2g—57 to 77 inches; olive gray (5Y 5/2) clay; common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm; few old decaying roots; mildly alkaline; abrupt smooth boundary.

The solum is about 45 inches thick and ranges from 40 to 60 inches. Cracks extend into the Bg horizon when the soil is dry. Some pedons are calcareous below a depth of 36 inches. The Ap horizon has value of 3 or 4 and chroma of 1 or 2. It is clay, silty clay, or silty clay loam. The Ap horizon is medium acid to mildly alkaline.

The Bg horizon has hue of 10YR to 5Y, value of 4 or 5, and chroma of 1. Some pedons are neutral in color in the lower part of the Bg horizon. The content of clay is more than 60 percent. The Bg horizon is medium acid to moderately alkaline.

The Cg horizon has hue of 10YR to 5Y, value of 4 or 5, and chroma of 1 or 2. Some pedons are neutral in color in the Cg horizon. It is clay or silty clay. The Cg horizon is neutral to moderately alkaline.

Sikeston series

The Sikeston series consists of deep, poorly drained soils that have a moderately slow permeability. These soils formed in alluvium in depressional channels and basins. These areas are a network of abandoned, braided natural channels. Slopes are 0 to 2 percent.

Sikeston soils are similar and generally adjacent to Cairo, Gideon, and Roellen soils. Cairo soils are in slightly lower channels and have a clayey mollic epipedon. Gideon soils are in slightly higher positions on the landscape and do not have the thick mollic epipedon. Roellen soils contain more clay throughout their profile and are generally in slightly lower positions.

Typical pedon of Sikeston loam, about 1,300 feet west and 500 feet north of SE corner of Sec. 31, T. 22 N., R. 10 E.

Ap—0 to 5 inches; very dark brown (10YR 2/2) loam; weak fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

A12—5 to 11 inches; very dark brown (10YR 2/2) sandy clay loam; weak fine subangular blocky structure; firm; few fine roots; few fine dark accumulations (Fe and Mn oxides); abrupt smooth boundary.

A13—11 to 21 inches; black (10YR 2/1) clay loam; weak fine subangular blocky structure; firm; few fine dark accumulations (Fe and Mn oxides); neutral; clear smooth boundary.

A14—21 to 31 inches; very dark gray (10YR 3/1) sandy clay loam; weak fine subangular blocky structure; friable; few fine and medium dark accumulations (Fe and Mn oxides); neutral; gradual smooth boundary.

AC—31 to 49 inches; dark gray (10YR 4/1) sandy clay loam; common fine faint dark yellowish brown (10YR 4/4) mottles; weak fine subangular blocky structure; friable; few fine dark concretions (Fe and Mn oxides); neutral; clear smooth boundary.

IIC—49 to 60 inches; dark grayish brown (2.5Y 4/2) sand; common medium distinct olive brown (2.5Y 4/4) mottles; single grain; loose; neutral.

The mollic epipedon is 24 to 42 inches thick. Reaction is typically neutral but ranges from slightly acid to mildly alkaline. Depth to the sandy IIC horizon is 33 to 49 inches. The A horizon has value of 2 or 3 and chroma of 1 or 2. It is typically loam but in places is sandy clay loam, clay loam, and sandy loam. The AC horizon has hue of 10YR to 5Y, value of 4 or 5, and chroma of 1 or 2. It is sandy clay loam, clay loam, or heavy loam. Mottles have hue of 5YR to 5Y, value of 4 or 5, and chroma of 2 to 6.

The IIC and C horizons have hue of 10YR and 2.5Y, value of 2 to 5, and chroma of 1 to 4. They are loamy sand, sandy loam, loamy fine sand, or sand, and generally are stratified.

Silverdale series

The Silverdale series consists of deep, moderately well drained soils formed in sandy over loamy alluvium. These soils are in small depressions on natural levees and have rapid over moderate permeability. Slopes are 0 to 2 percent.

Silverdale soils are in landscape positions adjacent to Dubbs and Dundee soils and are similar to Steele soils. Dubbs and Dundee soils have more silt and clay and have less sand in the upper layers of the profile. They have an argillic horizon. Steele soils have clayey lower horizons and are in lower positions on the landscape.

Silverdale loamy sand does not occur as a separate map unit within the county, but is mapped in complex with Dubbs silt loam or Dundee loamy sand soils.

Typical pedon of Silverdale loamy sand in an area of Dundee-Silverdale loamy sands, 1,815 feet west and 150 feet north of the center of Sec. 23, T. 16 N., R. 8 E.

Ap—0 to 8 inches; dark brown (10YR 3/3) loamy sand; very weak fine granular structure; very friable; few fine roots; medium acid; abrupt smooth boundary.

C1—8 to 20 inches; brown (10YR 4/3) sand; few fine and medium faint dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4), and few fine faint dark grayish brown (10YR 4/2) mottles; single grain; loose; slightly acid; clear smooth boundary.

C2—20 to 31 inches; dark grayish brown (10YR 4/2) sand; common fine and medium faint dark yellowish brown (10YR 4/4) mottles; single grain; loose; slightly coherent when moist; few fine dark soft accumulations (Fe and Mn oxides); medium acid; abrupt smooth boundary.

IIC3—31 to 50 inches; grayish brown (10YR 5/2) silt loam; common fine faint dark brown (10YR 4/3) mottles; massive, breaking easily to fine subangular blocky fragments; friable; slightly acid; clear smooth boundary.

IIC4—50 to 63 inches; light brownish gray (10YR 6/2) silt loam; common fine and medium faint dark yellowish brown (10YR 4/4) mottles; massive, breaking easily to fine subangular blocky fragments; friable; many fine dark soft accumulations (Fe and Mn oxides); slightly acid; abrupt smooth boundary.

IIIC5—63 to 70 inches; brown (10YR 5/3) sand; common fine faint grayish brown (10YR 5/2) mottles; single grain; loose; slightly acid.

The sandy upper layers commonly are 24 to 39 inches thick. The A horizon has value of 3 or 4 and chroma of 2 or 3. It commonly is loamy sand and ranges to sand, loamy fine sand, and sandy loam. The A horizon is medium acid to neutral.

The C horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 or 4. This horizon has mottles with chroma of 2 or less. The matrix of some pedons have chroma of 2 with brown mottles. The C horizon is sand or coarse sand and medium acid to neutral. The IIC horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. Some pedons have remnants of a buried surface with value of 3 or 4 and chroma of 2 or 3. The IIC horizon is silt loam, silty clay loam, or loam and commonly is slightly acid but ranges from medium acid to neutral. Mottles have value of 4 to 6 and chroma of 3 or 4. The IIIC horizon has value of 4 to 6 and chroma of 2 to 4. It is sand or loamy sand and is slightly acid or neutral.

Steele series

The Steele series consists of deep, moderately well drained, rapidly over slowly permeable soils that formed in sandy and clayey alluvium. Slopes are 0 to 2 percent.

Steele soils are similar to Sharkey and Silverdale soils. Steele soils are generally adjacent to Sharkey or Alligator soils which do not have thick sandy upper layers. Silverdale soils contain less clay in the lower horizons and are in higher positions on the landscape.

Steele loam is not mapped separately in the county, but is mapped in complex with Alligator or Sharkey silty clay loam.

Typical pedon of Steele loam from an area of Sharkey-Steele complex, 4,000 feet south and 1,350 feet west of the NE corner of Sec. 21, T. 16 N., R. 10 E.

Ap—0 to 4 inches; dark brown (10YR 3/3) loam; weak fine subangular blocky structure; friable; medium acid; abrupt smooth boundary.

A12—4 to 9 inches; dark brown (10YR 4/3) sandy loam; few fine faint brown (10YR 5/3) grayish brown (10YR 5/2) and pale brown (10YR 6/3) mottles; massive; very friable; few fine dark concretions (Fe and Mn oxides); slightly acid; abrupt smooth boundary.

C1—9 to 25 inches; pale brown (10YR 6/3) loamy sand; single grain; loose; contains strata less than 5 centimeters thick of very fine sandy loam; slightly acid; abrupt smooth boundary.

C2—25 to 31 inches; dark grayish brown (10YR 4/2) fine sandy loam; thin brown (10YR 5/3) and dark brown (7.5YR 4/4) very fine sandy loam strata; massive; very friable; mildly alkaline; abrupt smooth boundary.

IIC3g—31 to 42 inches; gray (10YR 5/1) clay with thin strata of dark brown (7.5YR 4/4) clay; moderate medium angular blocky structure; firm; few fine dark concretions (Fe and Mn oxides); neutral; abrupt smooth boundary.

IIC4g—42 to 50 inches; gray (5Y 5/1) clay; common fine prominent yellowish brown (10YR 5/6) mottles; massive; firm; few flecks of organic matter; few fine dark concretions (Fe and Mn oxides); mildly alkaline; clear smooth boundary.

IIC5g—50 to 61 inches; gray (5Y 5/1) clay; common fine prominent strong brown (7.5YR 5/6) mottles; massive; firm; few fine dark concretions (Fe and Mn oxides); mildly alkaline; clear smooth boundary.

IIC6g—61 to 85 inches; gray (5Y 5/1) clay; few fine distinct light olive brown (2.5Y 5/4) and few fine prominent strong brown (7.5YR 5/6) mottles; massive; firm; slightly acid.

The thickness of sandy layers and the depth to clayey horizons is 20 to 33 inches. The A horizon has value of 3 and chroma of 2 or 3. It is loam, sandy loam, or loamy sand and is medium acid to neutral.

The IIAb horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. It is silty clay or clay. Some pedons do not have the dark IIAb horizon.

The C horizon has value of 5 or 6 and chroma of 2 or 3 and has few to common mottles. It is sand or loamy fine sand. Some pedons have a loam or sandy loam C horizon above the IIA horizon. The IIC horizon has value of 4 or 5 and chroma of 1 or 2. It is clay or silty clay and is slightly acid or neutral.

Wardell series

The Wardell series consists of deep, poorly drained, slowly permeable soils in depressions and on low natural levees. These soils formed in loamy alluvium. Slopes are 0 to 2 percent.

Wardell soils are similar to Gideon soils and are often adjacent to Gideon and Lilbourn soils. Gideon soils are nonacid and do not have an argillic horizon. Lilbourn soils contain more sand in the upper horizon and do not have an argillic horizon.

Typical pedon from an area of Wardell loam, 1,300 feet west and 15 feet north of center of Sec. 25, T. 19 N., R. 9 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) loam, gray (10YR 5/1) dry; weak fine granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

B1g—8 to 21 inches; dark gray (10YR 4/1) clay loam; few pockets of light brownish gray (10YR 6/2) loam; common fine distinct light olive brown (2.5Y 5/4) mottles; weak medium subangular blocky structure; firm; common fine roots; strongly acid; clear smooth boundary.

B21tg—21 to 31 inches; gray (10YR 5/1) clay loam; faces of peds dark gray (10YR 4/1); few fine distinct olive brown (2.5Y 4/4) mottles; moderate medium subangular blocky structure; firm; clay films in some old root channels; few fine dark concretions (Fe and Mn oxides); common fine roots; strongly acid; clear smooth boundary.

B22tg—31 to 53 inches; dark gray (10YR 4/1) clay loam; few fine distinct light yellowish brown (2.5Y 6/4) light olive brown (2.5Y 5/4) and olive brown (2.5Y 4/4) mottles; moderate medium subangular blocky structure; firm; few fine dark concretions (Fe and Mn oxides); few fine roots; few patchy clay films; strongly acid; abrupt smooth boundary.

IIC1g—53 to 64 inches; dark gray (10YR 4/1) loamy fine sand; single grain; few fine roots; neutral; abrupt smooth boundary.

IIC2g—64 to 70 inches; gray (5Y 5/1 and 4/1) loamy fine sand; single grain; neutral.

The solum is 34 to 50 inches or more thick. The A horizon has hue of 10YR to 5Y, value of 3, and chroma of 1 to 3. It is mostly loam but ranges from fine sandy loam to clay loam. The A horizon is strongly acid to neutral. Thickness of the dark colored A horizon is less than 10 inches.

The B horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. It commonly is clay loam or loam. The B horizon has brownish mottles. It is strongly acid or medium acid.

The C or IIC horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. It ranges from sandy clay loam to sand and is strongly acid to mildly alkaline.

Classification of the soils

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Readers interested in further details about the system should refer to "Soil taxonomy" (*30*).

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or of factors that affect soil genesis. In table 18, the soils of the survey area are classified according to the system. Categories of the system are discussed in the following paragraphs.

ORDER. Ten soil orders are recognized as classes in the system. The properties used to differentiate among orders are those that reflect the kind and degree of dominant soil-forming processes that have taken place. Each order is identified by a word ending in *sol*. An example is Alfisol.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and are important to plant growth or that are selected to reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udalf (*Ud*, meaning moist, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of expression of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and a prefix that suggests something about the properties of the soil. An example is Hapludalfs (*Hapl*, meaning simple horizons, plus *udalf*, the suborder of Alfisol that have an Udic moisture regime).

SUBGROUP. Each great group may be divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other orders, suborders, or great groups; and the extragrades, which have some properties that are representative of the great groups but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that is thought to typify the great group. An example is Typic Hapludalf.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is fine-silty, mixed, thermic, Typic Hapludalf.

SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineral and chemical composition.

Formation of the soils

This section discusses the factors of soil formation, relates them to the formation of soils in the survey area, and explains the processes of soil formation.

Factors of soil formation

Soil is the product of soil forming processes that have acted upon materials deposited or accumulated by previous geological forces. The characteristics of the soil are determined by (1) the type of parent material, (2) relief or lay of the land, (3) climate under which the soil forming factors were active, (4) plant and animal life on and in the soil, and (5) the length of time these forces have been active.

The parent material affects and often determines the kind of soil profile that is developed. The relief often modifies other factors by exposing the parent material to soil forming factors in varying lengths of time. The climate determines the amount of water available for leaching and the amount of heat for physical and chemical changes. Plant and animal life, chiefly plants, are active in soil formation. Finally, time is required for changes to be made so that parent material becomes soil. Thus, parent material is altered by plants, animals, and climate to degrees determined by relief over a length of time.

These factors are all interrelated and each is dependent on the other four. Soil formation is complex, and many processes of soil development are unknown.

Parent material

The properties and characteristics of the parent material dictate the texture and mineralogy of most soils of Dunklin County. Parent material is the unconfined mass from which soils formed, and the accumulation of this material can be considered the first step in soil formation. Soil drainage and soil color are influenced by the parent material as well. Where the original deposited sediment is loamy, the soils that formed in this material are likewise loamy. Even those soils that have had some clay movement within the soil profile still have textures determined by the parent material. Clayey sediment high in such clays as montmorillonite impart characteristics that form clayey soils. The montmorillonitic mineralogy remains, even though there are alterations in the parent material.

The parent material often determines some of the soil color. Fresh sediment is generally grayish brown in color and gets browner with weathering or grayer with less aeration. The sediment in which Falaya soils formed is fresh. Collins soils formed on natural levees, or areas that are high enough to start weathering, in materials similar to those in which Falaya soils formed. Materials that are poorly aerated, such as Sharkey soils, are gray because of lack of aeration caused by the parent material.

The parent materials of most of Dunklin County result from geological deposits made by the Mississippi River and its tributaries. These deposits vary in age and composition, since they came from several places throughout the area drained by the Mississippi and Ohio Rivers. The remainder is loess and Gulf Coastal Plain deposits of Crowleys Ridge (*19*). This ridge dictates the type of parent materials and, thus, the soil that formed.

Crowleys Ridge is the only upland in Dunklin County. The east slopes generally are abrupt, but on the west side they grade off imperceptibly into the lowland. The outline of the ridge is considered to reflect faulting (*13*). Most of Crowleys Ridge is covered with a blanket of wind-blown silts called loess (*4*). Deposits usually range from about 4 to as much as 30 feet thick. Memphis soils formed in the better drained areas (*16*). Loring soils formed generally in lower positions on the uplands, but have a fragipan. The loess overlies sandy and gravelly deposits which are exposed in pits and along the eastern edge of the upland (fig. 27).

At one time the main channel of the Mississippi River flowed west of Crowleys Ridge (*13*). Later it changed its channel to the east side of Crowleys Ridge.

Soils such as Dubbs, Bosket, and Farrenburg formed in the flatter and loamy-textured positions on natural levees. These soils formed across the top of old natural levees, and have an argillic horizon that formed in the original parent materials.

The backswamp positions where the sediments were deposited by still water produced soils such as Sharkey and Alligator soils. These soils are high in clay content and have montmorillonitic mineralogy dictated by the type of parent materials (*3*). Areas of Steele soils formed in sandy and clayey deposits. These deposits are sandy areas over clayey sediments from which Sharkey soils formed.

Local streams and drains that flow from the uplands have carried materials along the stream. Falaya and Collins soils formed in these deposits, which were washed from the adjacent upland by erosion. They are high in silt because of their parent materials.

The deposits made by the Mississippi River west of Crowleys Ridge are older and more weathered than those east of Crowleys Ridge, since the river flowed west of the ridge at first. The soils west of Crowleys Ridge have much more silt, have a leached albic horizon, and a strongly developed argillic horizon. Most of these soils are also strongly acid because of leaching and weathering. Crowley and Calhoun soils are examples of acid soils with an albic and an argillic horizon.

However, a few old terraces high in silt content were also high in weatherable feldspars that weathered to produce a sodium-magnesium concentration that affects plant growth (*15*). Foley and Lafe soils formed in this material and are moderate to high in sodium-magnesium content within some part of the argillic horizon. Argillic horizons that also have sodium saturation are called "natric" horizons (*30*).

In contrast to the silty, acid, and leached soils west of Crowleys Ridge are those soils east of the ridge. They range from sand to clay in texture, and most have at least 10 percent sand. Most soils are medium acid or higher in reaction. Many of the soils have no argillic horizon, or those that do are only weakly expressed.

The higher sandy natural levees formed in deep sandy materials that were relatively low in weatherable minerals. These materials are considered to be alluvial outwash of the Ohio River prior to the Ohio and Mississippi flowing together (*13*). Malden soils formed in these materials. Where the sandy material had enough silt and clay, it was altered and an argillic horizon formed below the sandy surface. Broseley soils formed in these areas. At low elevations of these sandy and loamy natural levees, the Canalou soils formed. This elevation was low enough that a water table fluctuated in the soil during formation.

The sandy and loamy natural levees east of the uplands were naturally drained by a system of gathering channels, main channels, and sloughs of the braided stream that emptied into the St. Francis River. Soils of these drains have properties that reflect their parent materials. As streams overflowed, sand was deposited first while the stream had sufficient flow and velocity to carry sand particles. Later, when the stream was slowed and had no outlet, it became ponded and clay began to settle out of the still water. Thus the soils of these drains have sand under the clayey surface layer. Cairo soils developed in the old main channel where the thickness of clay is about 30 to 40 inches. Roellen soils formed in adjacent positions where the clayey layers are thicker. In areas that were not ponded for long periods the sediment was a mixture of sand, silt, and clay. Sikeston soils developed in the lower positions, and Gideon and Wardell soils on the slightly higher ridges. These soils have loamy textures because of their parent materials.

Relief and topography

Topography, or "the-lay-of-the-land", is closely related to patterns and forces of deposition and soil formation. Most local differences in the county are due to natural levee formation adjacent to channels and backswamp areas. However, the slopes of uplands are also closely related to soil formation. Subsequent dissection of natural levees and backswamp areas by migrating channels have added complexity. Local differences in elevation in the part of the county with alluvial soils, generally are slight, with the exception of short slopes on the edge of ridges which have differences of 10 to 15 feet in elevation in only a few hundred feet. This part of the county ranges in elevation (above sea level) from about 300 feet west of the upland and 295 feet east of the upland to about 235 feet in the southern part of the county. The lowest elevation in Missouri is in the southern part of the county. Crowleys Ridge ranges in elevation from about 295 feet on the toe slope to knolls of more than 500 feet. Surface slope, and therefore drainage, is generally in a south or southwesterly direction.

The main influence of topography on soil formation in the part of the county that has alluvial soils has been largely that of soil drainage and water table height and duration (*31*). Water drains off the higher convex natural levees quickly. The flatter natural levees drain more slowly but are eventually drained. The natural levees are above the static ground water table, but some are subject to a perched water table. Since these soils are above the water table and surface water drains off, they are brown and well drained or excessively drained. Soils such as Malden, Dubbs and Bosket soils formed in these positions.

The runoff from the higher positions accumulates in narrow drainageways on the natural levees that flow into larger drainageways. These are ponded or saturated for

intermittent periods, depending on the location in and the size of the drainageway. The areas are wet long enough for gray colors to develop. Dundee and Lilbourn soils formed in these areas. The larger drainageways have more standing water and are more poorly drained. Gideon, Cairo, Roellen, and Sikeston soils formed in these positions.

West of Crowleys Ridge the soils are slowly permeable and generally have a perched water table. These soils have gray colors and are the Calhoun and Crowley soil series.

The depressional clayey drainageways that serve as the old natural channels are clayey because of the type of deposits. The large volume of water overfills the channel and is flooded. During wet periods, when the outlet is not open, the channel is filled and the ground water table is near the surface. Water is then ponded on the surface until it evaporates or moves slowly into the clayey soil. When dry, the water table recedes below the soil. Soils that have developed in this alternating wetting and drying are Sharkey, Alligator, and Jackport soils.

On the uplands, the smoother parts of the ridge have more strongly developed soils than the more sloping areas. The ridge positions are stable and subject to the process of soil formation more than those of the side slopes. Because of increased runoff, the soils on the more sloping areas have less water movement and thus less development. The flatter areas accumulate runoff and generally have a fragipan.

Climate

The climate of Dunklin County is of the humid, temperate, continental type. The average annual precipitation is about 50 inches, with about half falling during the April to September growing season. Short periods of excess rainfall are common. This rainfall is part of one of the major soil developing processes known as weathering. The soils are frozen for very short periods in winter.

This climate has prevailed throughout the period of soil formation in the county. However, because of the relatively short period of time that most soils of the county have been subjected to factors of soil formation, climate has not made its full impact.

The humid temperate climate of Dunklin County is conducive to the relatively rapid breakdown of minerals for the formation of clay within the soil. The clay is moved downward in the soil profile, and this process is known as eluviation. Soils such as Bosket, Dubbs, Dundee, Calhoun, Crowley, and others have had such clay movements. Other regions with a humid temperate climate normally have strongly weathered, leached, and acid soils of low fertility. But this is not true for most of Dunklin County since most of the Mississippi River Delta soils are geologically young. Soils on Crowleys Ridge, such as Memphis and Loring, and those west of the ridge are leached, acid, and generally lower in natural fertility than those east of the ridge. Even though these soils are considered the most weathered of the county, they are not strongly weathered.

Though temperature and rainfall have been favorable for accelerated soil formation, time has prevented climate from having its full impact.

Plant and animal life

Most of the soils of this county are relatively young, but the influence of biological factors on soil formation is evident. The older soils, such as Loring and Memphis soils on Crowleys Ridge, show biological influence.

Plants remove chemicals from the soil throughout the reach of their roots and translocate those to growing parts above the soil. Leaves and other plant parts later return to the soil to decay and add nutrients and organic matter. The roots loosen soil aggregates, and when roots decay they leave channels for water and air movement.

The native plant community was probably static during soil formation. The primary vegetation has been forest. From soil colors it would appear that soils east of Crowleys Ridge had some prairie grass influence during development.

Forest types that have existed correspond to soil patterns. Baldcypress and ash were dominant in the slack water areas now occupied by soils such as Alligator, Sharkey, and Roellen soils.

On the uplands and old natural levees, the forest type was dominantly hickory, white oak, and southern red oak. The soil drainage and reaction were favorable for the growth of oaks. Soils such as Bosket, Beulah, Dubbs, and Farrenburg soils are on the natural levees, and Loring and Memphis soils are on the uplands. Some pecan and walnut trees were on the higher and better drained natural levees.

On the low natural levees, the forest type is mostly species of wet oak and hickory; as well as water oak, pin oak, willow oak, and sweetgum. Calhoun, Crowley, Gideon, and Wardell soils are examples of soils in these positions.

Soils that formed east of Crowleys Ridge have darker colored surfaces, which indicate some grass influence. In general, soils that formed under grass vegetation are darker in color than those that formed under trees. The dark color of Bosket, Cairo, Gideon, and Roellen soils is an example of this.

The chemical properties as well as some physical properties of soils are influenced by activities of bacteria and fungi.

The effect of animals on soil formation is difficult to measure or estimate. Terrestrial influences range from activities of worms, rodents, and crustaceans in the soil to large animals that travel the surface of the soil. Most observations were confined to earthworm and crayfish activity. Both of these favor moist loamy soils and were

seldom observed in sandy or clayey soils. Crayfish colonies were often observed in the Crowley, Calhoun, Fountain, Roellen, and Sharkey soils. In many places they have mixed the albic and argillic horizons in Calhoun and Fountain soils and account for many discontinuous pockets of silt.

Man, both aboriginal and modern, has affected soil development in this county for many centuries. Many areas that have unusually dark surfaces have been identified as sites of aboriginal homes. Most of these ancient campsites are small, ordinarily less than one acre. They are often found adjacent to old waterways on high, well drained soils. These sites normally occur where there are areas of Bosket, Canalou, and Dubbs soils. However, modern man has made a more profound impact on the soil environment than these early occupants. The major alteration has resulted from changes in vegetation, drainage, relief, and the addition of irrigation water. The soils developed mostly under forest vegetation, yet less than 6 percent of the county now has tree vegetation.

The natural drainage of the county has been altered by construction of large drainageways such as the Little River drainage system and the new channel of the St. Francis River. Numerous smaller ditches have also been constructed. Landforming by land leveling, land grading, land smoothing, or filling potholes has altered the local relief and drainage and as a result has affected the soil environment. The clearing of Crowleys Ridge and its use for cropland and orchards has increased erosion on unprotected slopes. The addition of irrigation water is gradually changing the soils to a less acid reaction. Plowing the soil, addition of fertilizer and amendments and other chemicals, and introducing new plant species also affect the soils. These are recent changes, and time is needed to see what impact they will have on soil formation.

Time

The length of time parent materials have been in place influences soil characteristics. Time is also required for the soil-forming processes to express themselves as soil characteristics. However, influence of the parent sediment is such that a sandy soil leaches and weathers faster than a clayey soil.

The exposed Coastal Plains deposits of Crowleys Ridge are probably the geologically oldest landscape in the county. They are Pliocene or early Pleistocene (*19*). Orthents, steep occupy these positions.

The loess of the uplands is probably the next oldest and has been in place since the Pleistocene (*19*).

The Memphis and Loring soils of these positions are weathered and have an argillic horizon. However, on the more sloping positions the argillic horizon is less well defined, and is often exposed by the eroded areas.

The other sediments of the county are geologically young. Insufficient time has passed to allow strong weathering of the minerals in these sediments (*31*). Even though the soils are geologically young, differences are apparent. Soils west of the uplands are leached and have an albic horizon that tongues into the upper part of the argillic horizon. This is considered a developed soil that is now leaching the upper part of the argillic horizon (*30*). Calhoun and Foley soils have these characteristics. A leached albic horizon and strong argillic horizon are common west of the upland in Crowley, Calhoun, and Foley soils. The weathering of feldspars and formation of a natric horizon in Lafe and Foley soils are also indications of the amount of time soils west of the uplands have been developing.

Soils east of the uplands are younger than most of those to the west. They generally have been leached less through time and have less acid reaction. Very few soils east of the uplands have an albic horizon. The soils that formed on the older and higher natural levees show the most evidence of soil formation as influenced by time. These soils have been more exposed to the factors of soil formation because of their relief. They have an argillic horizon where the parent material had enough silt and clay eluviation. Dubbs, Bosket, Farrenburg, and Broseley soils formed in these positions. The Beulah soils formed in similar positions and are slightly weathered, but not to the point of forming an argillic horizon. They have had some leaching of the most soluble materials, some alteration of the parent material into structure, and some color change in the subsoil. Soils of this nature have a cambic horizon.

The clayey soils of the slack water areas show some influence of time. Alligator soils generally are in the older backswamp areas along abandoned channels. The Sharkey soils are in younger backswamp areas. Both soils have a cambic horizon that formed under alternate wetting and drying, which favors reduction and oxidation. As a result of time and age the Alligator soils are strongly acid or very strongly acid in the cambic horizon but slightly acid or neutral in the C horizon, which is not leached. On the other hand, Sharkey soils, which have not been subject to so much leaching, are slightly acid to moderately alkaline in the cambic horizon. Apparently the leaching of bases has progressed further in the Alligator soils than in Sharkey soils (*31*). Because of the very slow permeability of these clayey soils, leaching of bases is very slow.

Some soils are stratified or have bedding planes indicative of young soils with little alteration. Collins soils have such bedding planes, which indicate that they haven't been in place long enough for the formation of even a cambic horizon (*30*). Gideon, Lilbourn, and Falaya soils also show little sign of alteration. These have a surface darkened by organic matter but lack diagnostic subsurface horizons. The reaction is generally dependent on the type of parent material.

Time is necessary for the processes of soil formation to have their impact on parent materials. Time is re-

quired for all the other factors of soil formation to take place. The length of time sediment has been in place has significantly influenced the development of soils in Dunklin County.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim. An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to frequent flooding.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Coarse textured (light textured) soil. Sand or loamy sand.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the bases of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures is difficult.

Complex, soil. A map unit of two or more kinds of soil occurring in such an intricate pattern that they cannot be shown separately on a soil map at the selected scale of mapping and publication.

Compressible. Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is 40 or 80 inches (1 or 2 meters).

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave. Unstable walls of cuts made by earth-moving equipment. The soil sloughs easily.

Deferred grazing. A delay in grazing until range plants have reached a specified stage of growth. Grazing is deferred in order to increase the vigor of forage and to allow desirable plants to produce seed. Contrasts with continuous grazing and rotation grazing.

Delta. An alluvial deposit, commonly triangular in shape, formed largely beneath water and deposited at the mouth of a river or stream.

Depth to rock. Bedrock at a depth that adversely affects the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes a bare surface.

Excess alkali. Excess exchangeable sodium. The resulting poor physical properties restrict the growth of plants.

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake. The rapid movement of water into the soil.

Favorable. Favorable soil features for the specified use.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured (heavy textured) soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years.

Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; *November-May*, for example, means that flooding can occur during the period November through May. Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. A soil having one or more neutral gray horizons as a result of waterlogging and lack of oxygen. The term "gleyed" also designates gray horizons and horizons having yellow and gray mottles as a result of intermittent waterlogging.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Green manure (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table, which is the upper limit of saturation.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Habitat. The natural abode of a plant or animal; refers to the kind of environment in which a plant or animal normally lives, as opposed to the range or geographical distribution.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand and loamy sand.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. Inadequate strength for supporting loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous areas. Areas that have little or no natural soil, are too nearly inaccessible for orderly examination, or cannot otherwise be feasibly classified.

Moderately coarse textured (moderately light textured) soil. Sandy loam and fine sandy loam.

Moderately fine textured (moderately heavy textured) soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse* more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three single variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Plant nutrients are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil. A pan impedes the movement of water and the growth of roots. The word "pan" is commonly combined with other words that more explicitly indicate the nature of the layer; for example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *slow* (0.06 to 0.20 inch), *moderately slow* (0.2 to 0.6 inch), *moderate* (0.6 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

Phase, soil. A subdivision of a soil series or other unit in the soil classification system based on differences in the soil that affect its management. A soil series, for example, may be divided into phases on the basis of differences in slope, stoniness, thickness, or some other characteristic that affects management. These differences are too small to justify separate series.

pH value. (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Piping. Moving water forms subsurface tunnels or pipelike cavities in the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from a semisolid to a plastic state.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Poorly graded. Refers to soil material consisting mainly of particles of nearly the same size. Because there

is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets. Surface or subsurface drainage outlets difficult or expensive to install.

Productivity (soil). The capability of a soil for producing a specified plant or sequence of plants under a specified system of management. Productivity is measured in terms of output, or harvest, in relation to input.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rooting depth. Shallow root zone. The soil is shallow over a layer that greatly restricts roots. See Root zone.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Seepage. The rapid movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. Locally, a small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake. The slow movement of water into the soil.

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Stratified. Arranged in strata, or layers. The term refers to geologic material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use or management.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea. A stream terrace is frequently called a second bottom, in contrast with a flood plain, and is seldom subject to overflow. A marine terrace, generally wide, was deposited by the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer. Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Unstable fill. Risk of caving or sloughing in banks of fill material.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

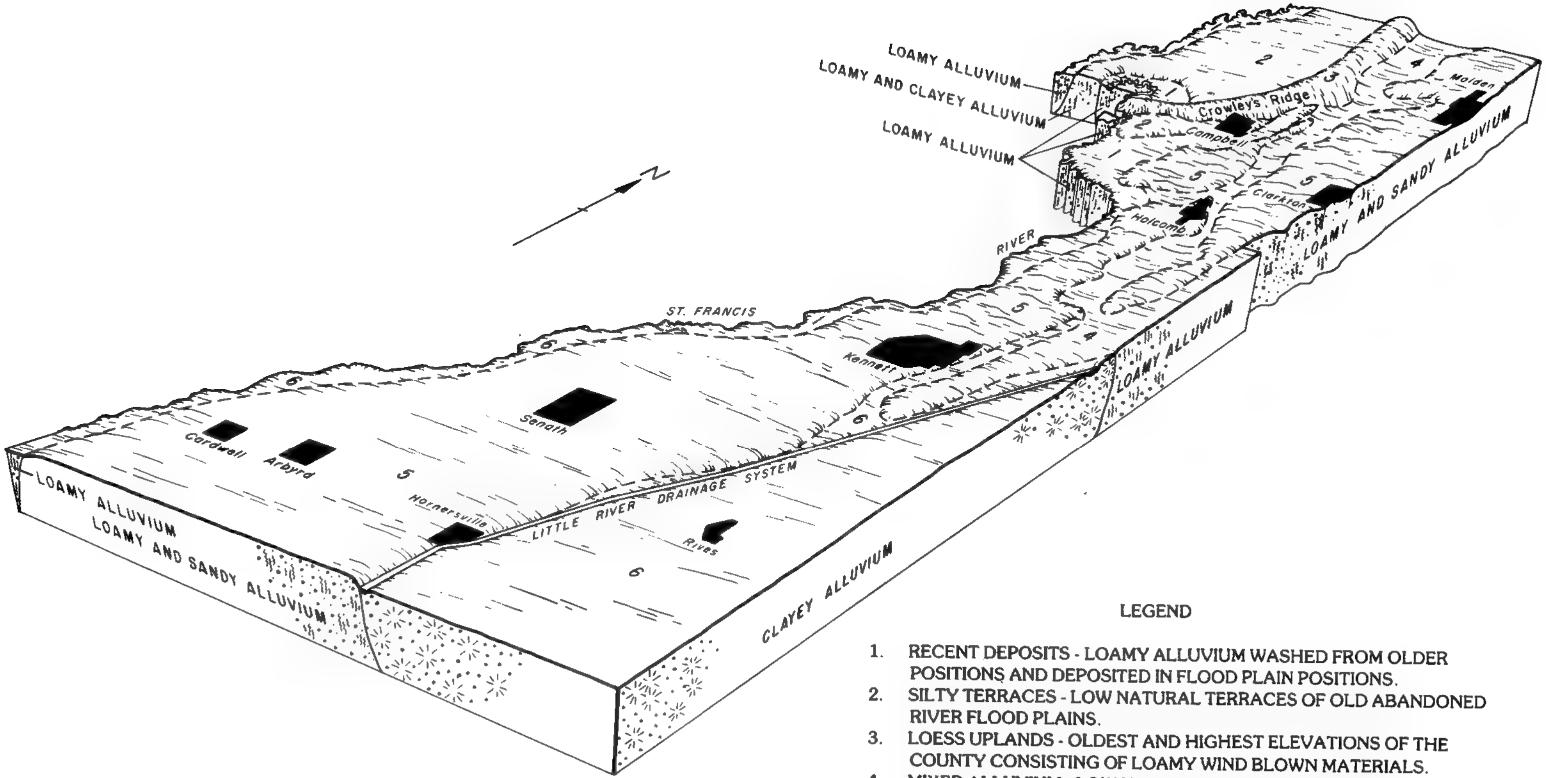
Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to a soil or soil material consisting of particles well distributed over a wide range in size or diameter. Such a soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

ILLUSTRATIONS

Figure 1.—Farm pond in Memphis soil on an upland area of Crowleys Ridge.



LEGEND

1. RECENT DEPOSITS - LOAMY ALLUVIUM WASHED FROM OLDER POSITIONS AND DEPOSITED IN FLOOD PLAIN POSITIONS.
2. SILTY TERRACES - LOW NATURAL TERRACES OF OLD ABANDONED RIVER FLOOD PLAINS.
3. LOESS UPLANDS - OLDEST AND HIGHEST ELEVATIONS OF THE COUNTY CONSISTING OF LOAMY WIND BLOWN MATERIALS.
4. MIXED ALLUVIUM - LOW NATURAL LEVEES AND DRAINS ON SWELLS AND SWALES. POSITIONS OF BRAIDED STREAM CHANNELS.
5. NATURAL LEVEES - HIGHEST ELEVATIONS OF THE LOAMY AND SANDY ALLUVIUM.
6. GUMBO FLATS - CLAYEY, NEARLY LEVEL TO DEPRESSIONAL AREAS OF BACKSWAMP POSITIONS.

Figure 2.—Surface features of Dunklin County, Missouri.

Figure 3.—Accelerated soil erosion in the timbered loess upland of Crowleys Ridge.

Figure 4.—Aerial spraying of cotton for insects, a method also used for applying fertilizer, herbicides, and defoliants, as well as for seeding.

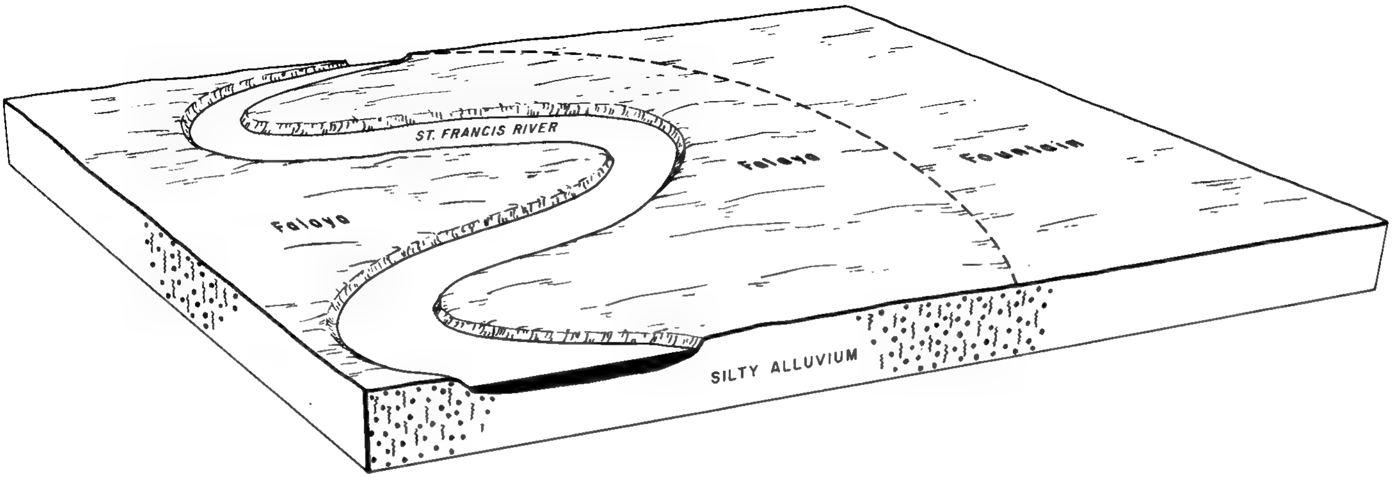


Figure 5.—Parent materials and positions of soils in Falaya-Fountain association.

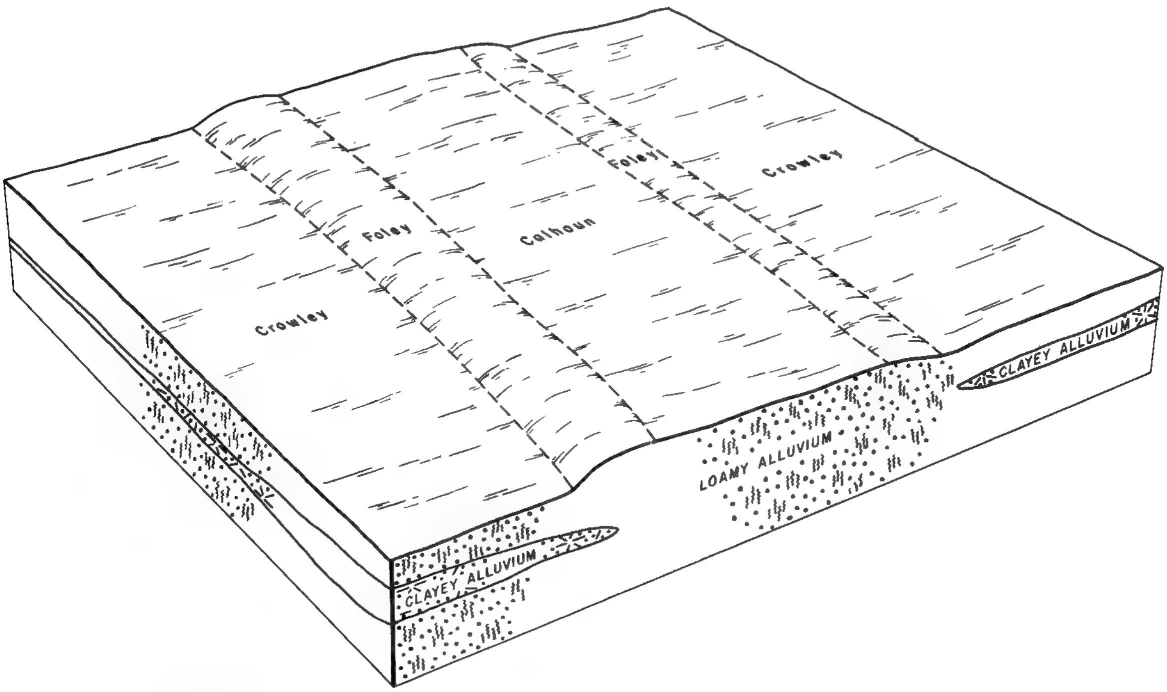


Figure 6.—Parent materials and positions of soils in Crowley-Calhoun-Foley association.

Figure 7.—Grain sorghum on Crowley silt loam. Cracks are common where the clayey subsoil is near the surface.

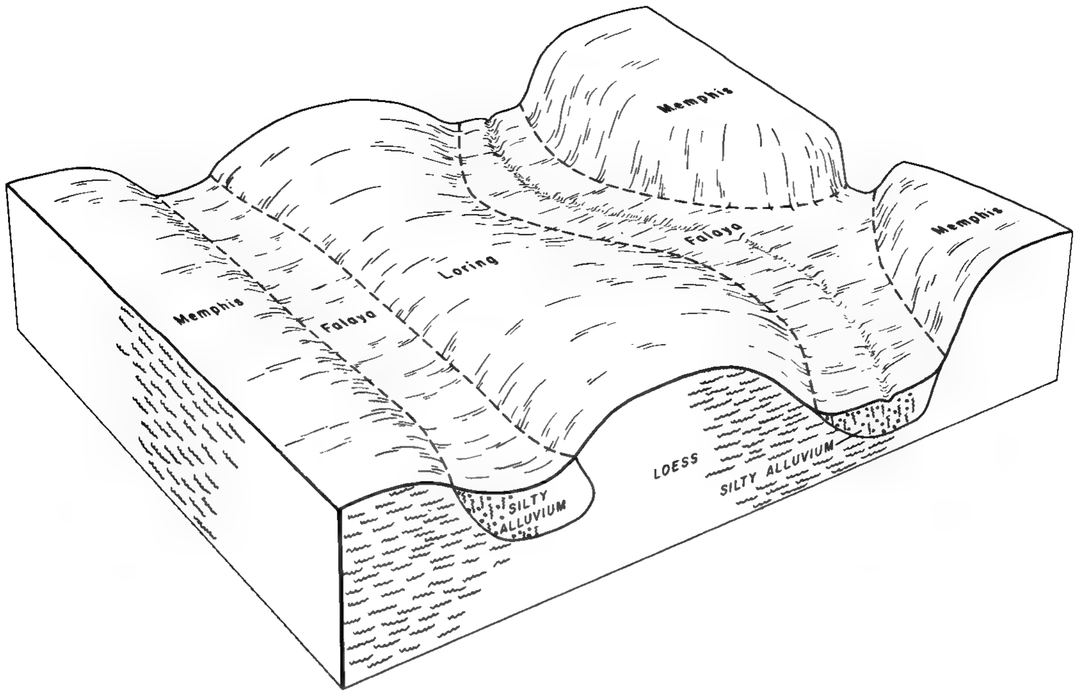


Figure 8.—Parent materials and position of soils in Loring-Memphis-Falaya association.

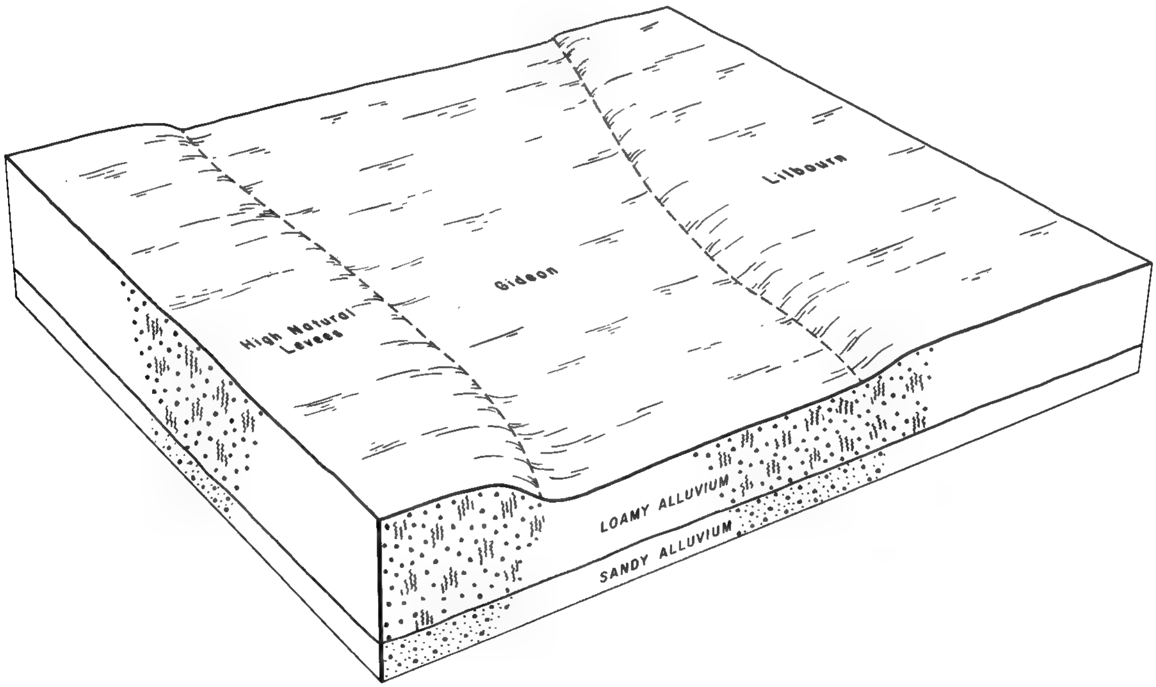


Figure 9.—Parent materials and position of soils in Gideon-Lilbourn association.

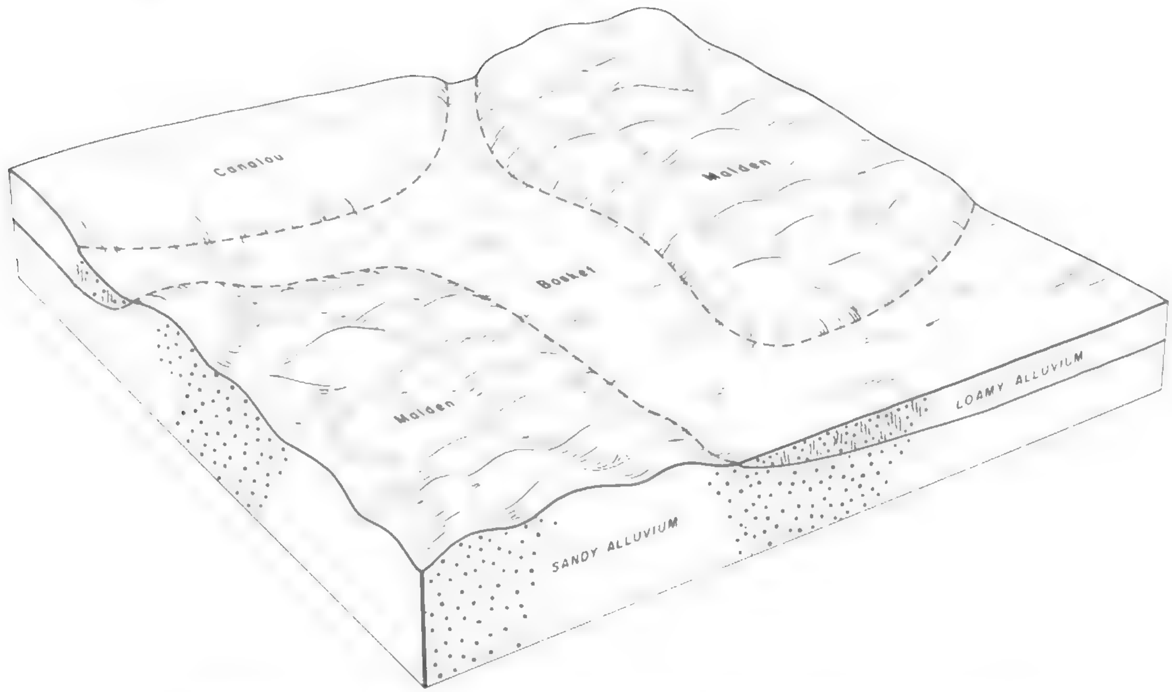


Figure 10.—Parent materials and position of soils in Malden-Canalou-Bosket association.

Figure 11.—Watermelons are grown on the higher and sandier natural levees in the Malden-Canalou-Bosket association.

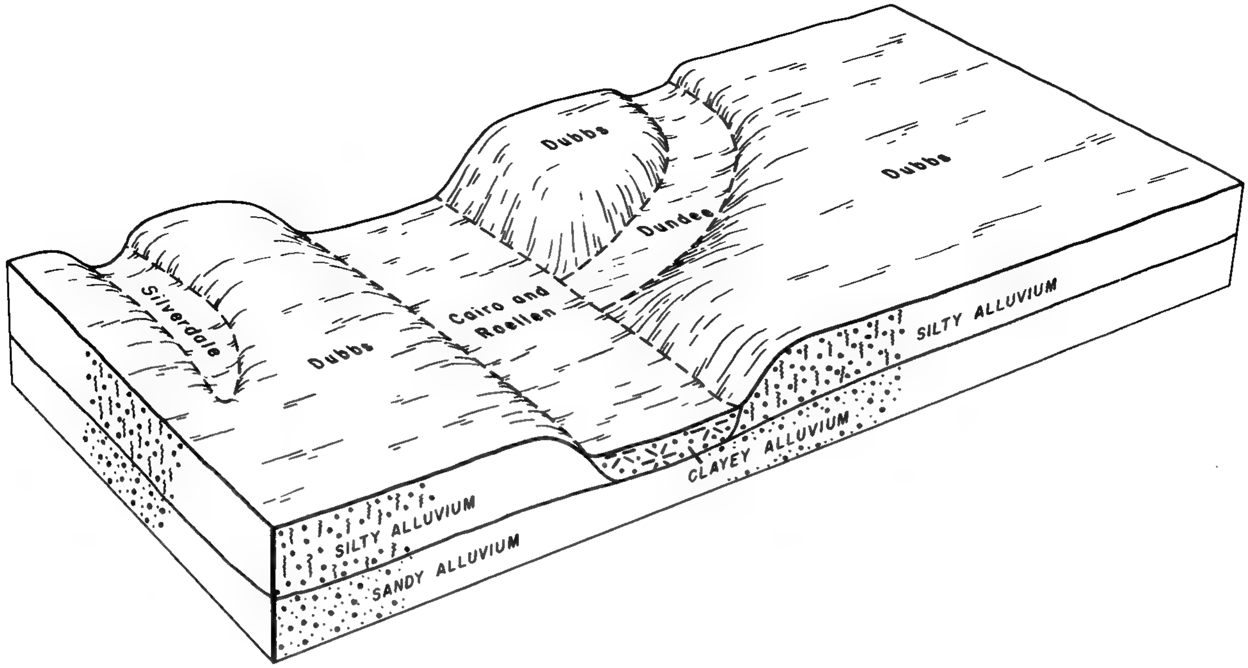


Figure 12.—Parent materials and position of soils in Dubbs association.

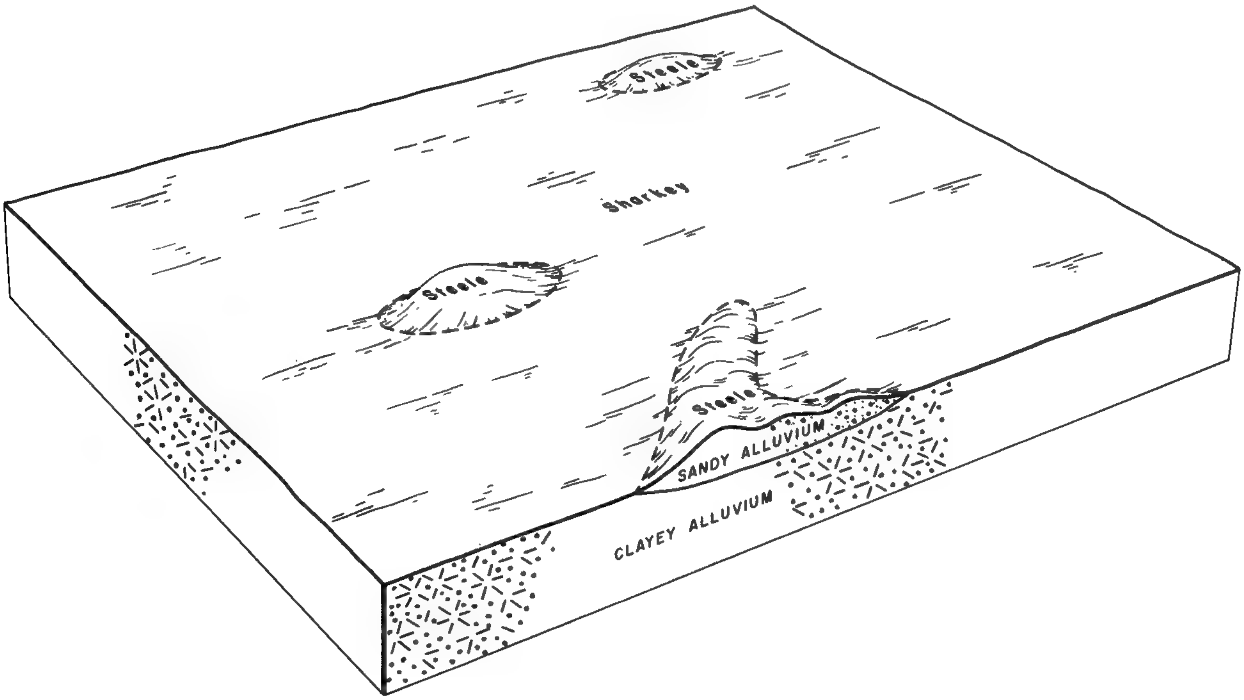


Figure 13.—Parent materials and position of soils in Sharkey association.

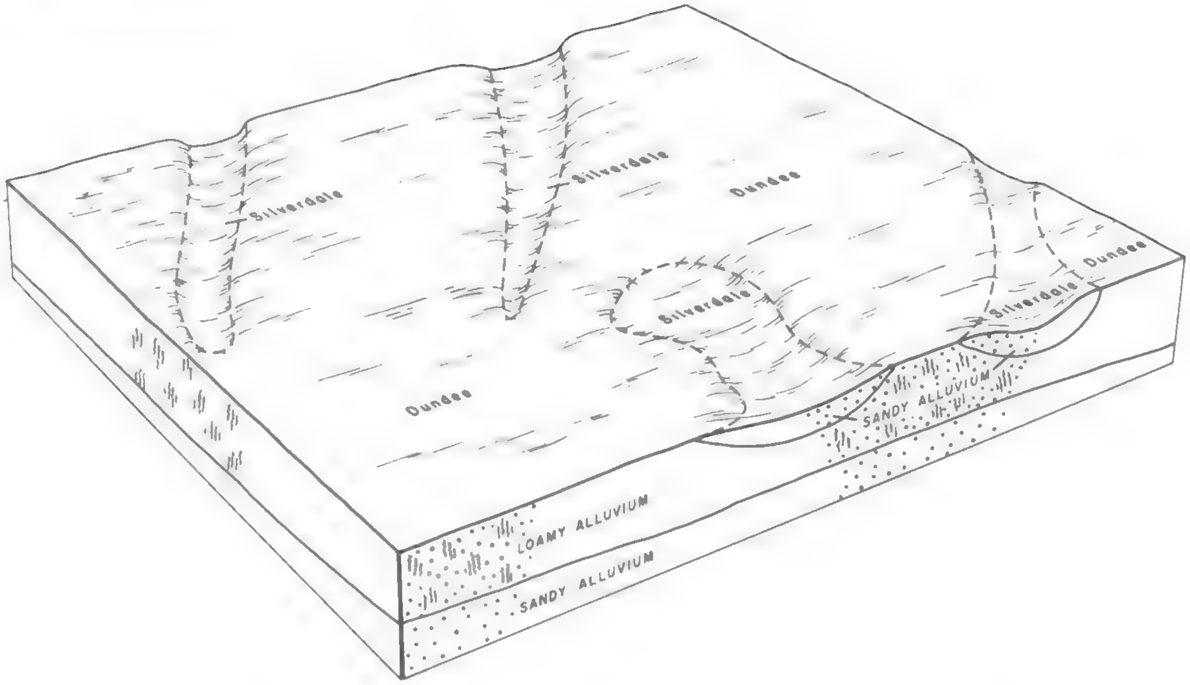


Figure 14.—Parent materials and position of soils in Dundee-Silverdale association.

Figure 15.—Harvesting wheat on Beulah fine sandy loam, 0 to 2 percent slopes.

Figure 16.—Harvesting irrigated corn on Canalou loamy fine sand.

Figure 17.—Grain sorghum on Dundee-Silverdale loamy sand.

Figure 18.—Wheat ready for harvest on Loring silt loam.

Figure 19.—Irrigation of Malden fine sand, 0 to 4 percent slopes, by a center pivot sprinkler.

Figure 20.—Young peaches on Memphis silt loam, 5 to 9 percent slopes.

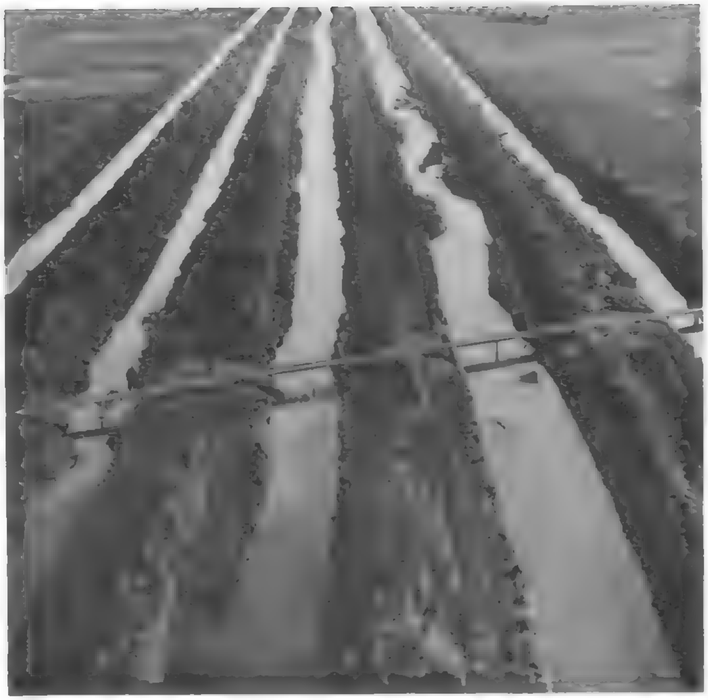


Figure 21.—The Little River drainage system flows about 20 miles through the eastern part of the county.

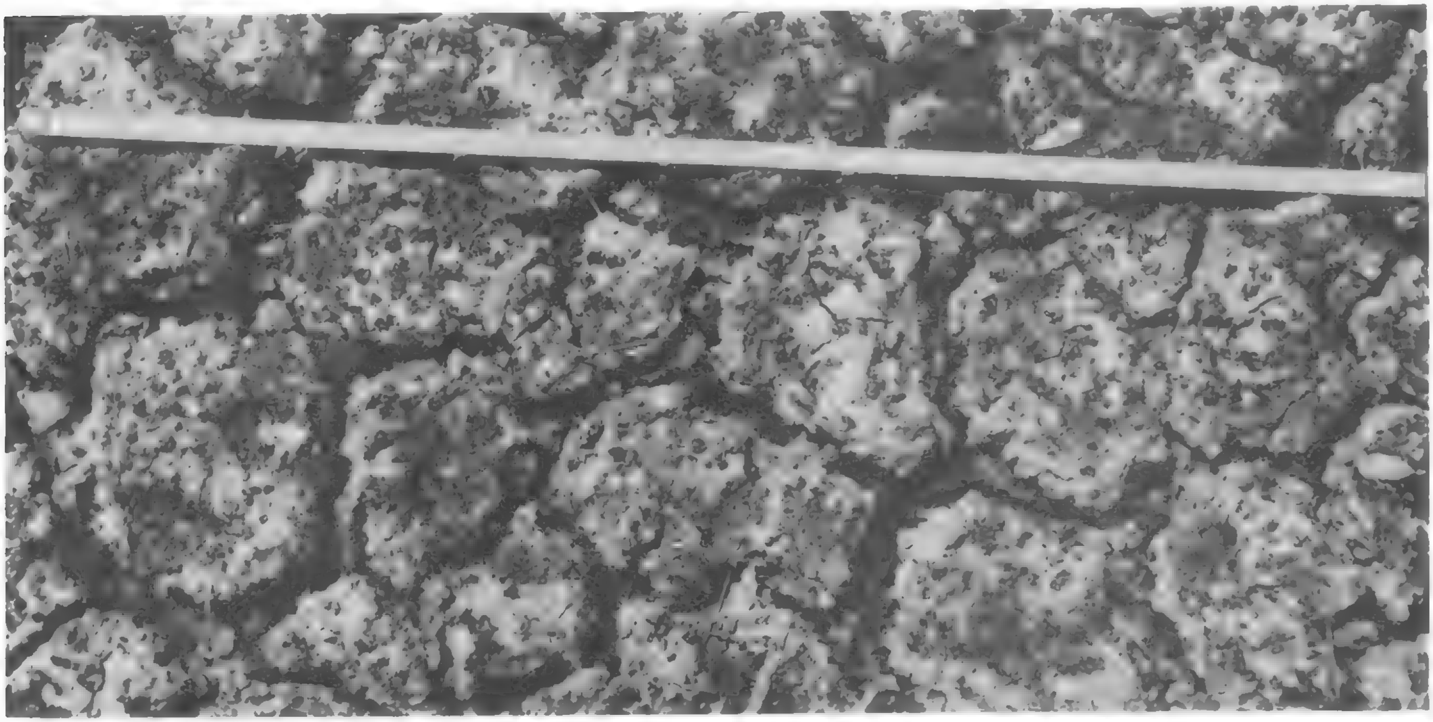


Figure 22.—Cracks in the surface of Sharkey soil account for the local name of "gumbo".

Figure 23.—Wheat strips protect Broseley loamy fine sand from wind erosion.

Figure 24.—Aquifers at 100-foot depths supply water for furrow irrigation.

Figure 25.—A stand of white and Scotch pine, 17 years old, on Malden fine sand, 0 to 4 percent slopes. Scale in foreground is 7.5 feet.

Figure 26.—Borrow areas excavated to build levees serve as rest areas for migrating waterfowl and hold fish and other aquatic species.

Figure 27.—Upland area of Crowleys Ridge is underlain by gravelly deposits used locally for road materials.

TABLES

TABLE 1.--TEMPERATURE AND PRECIPITATION DATA

[Data were recorded in the period 1953-74 at Kennett, Missouri]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	46.6	27.1	36.9	72	1	0	4.01	1.72	5.85	6	2.5
February---	51.7	30.8	41.3	74	8	26	3.97	1.96	5.60	7	2.0
March------	60.8	38.0	49.5	83	15	156	4.80	2.43	6.72	8	1.8
April------	73.6	48.7	61.2	89	28	341	5.10	2.62	7.11	8	.0
May--------	82.0	57.5	69.8	95	37	614	5.79	3.29	7.83	7	.0
June-------	89.7	65.0	77.4	101	48	822	4.04	2.28	5.47	7	.0
July-------	92.2	68.5	80.4	102	53	942	3.41	2.13	4.56	6	.0
August-----	90.9	66.0	78.5	102	50	884	3.54	1.47	5.21	5	.0
September--	85.0	59.5	72.3	98	38	669	3.76	1.28	5.73	5	.0
October----	75.9	48.2	62.0	92	27	376	2.45	.77	3.77	4	.0
November---	61.4	38.2	49.8	81	17	78	4.36	1.84	6.39	6	.2
December---	49.8	31.0	40.4	72	7	25	4.20	2.34	5.71	7	1.5
Year-----	71.6	48.2	60.0	104	0	4,933	49.43	38.86	60.55	76	8.0

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data were recorded in the period 1953-74 at Kennett, Missouri]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 2	April 7	April 16
2 years in 10 later than--	March 26	April 4	April 13
5 years in 10 later than--	March 12	March 28	April 6
First freezing temperature in fall:			
1 year in 10 earlier than--	November 2	October 25	October 14
2 years in 10 earlier than--	November 7	October 29	October 18
5 years in 10 earlier than--	November 17	November 4	October 25

TABLE 3.--GROWING SEASON LENGTH

[Data were recorded in the period 1953-74 at Kennett, Missouri]

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	223	205	185
8 years in 10	232	211	191
5 years in 10	249	221	202
2 years in 10	266	231	213
1 year in 10	275	237	219

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
Ag	Alligator silty clay loam	4,238	1.2
Ak	Alligator-Steele complex	2,082	0.6
Ba	Baldwin silty clay loam	803	0.2
BeA	Beulah fine sandy loam, 0 to 2 percent slopes	5,064	1.5
BeB	Beulah fine sandy loam, 2 to 5 percent slopes	661	0.2
Bk	Bosket fine sandy loam	13,103	3.8
BrB	Broseley loamy fine sand, 2 to 5 percent slopes	9,438	2.7
Ca	Cairo silty clay	8,041	2.3
Ch	Calhoun silt loam	6,071	1.8
Cn	Canalou loamy fine sand	17,431	5.0
Co	Collins silt loam	2,148	0.6
Ct	Cooter silty clay	932	0.3
Cw	Crowley silt loam	16,347	4.7
Db	Dubbs silt loam	23,758	6.8
De	Dubbs-Silverdale complex	15,260	4.4
Dn	Dundee silt loam	12,611	3.6
Ds	Dundee-Silverdale loamy sands	25,930	7.5
Fa	Falaya silt loam	12,706	3.7
Fg	Farrenburg fine sandy loam	7,953	2.3
Fo	Foley silt loam	2,427	0.7
Ft	Fountain silt loam	3,135	0.9
Gd	Gideon loam	23,583	6.8
Jp	Jackport silty clay loam	1,303	0.4
Lf	Lafe silt loam	422	0.1
Ln	Lilbourn fine sandy loam	12,955	3.7
LoB	Loring silt loam, 2 to 5 percent slopes	1,524	0.4
LoC	Loring silt loam, 5 to 9 percent slopes	2,090	0.6
LoD2	Loring silt loam, 9 to 14 percent slopes, eroded	1,574	0.5
Ma	Malden fine sand, 0 to 4 percent slopes	23,382	6.7
MeC	Memphis silt loam, 5 to 9 percent slopes	2,308	0.7
MeD	Memphis silt loam, 9 to 14 percent slopes	1,475	0.4
MeE2	Memphis silt loam, 14 to 30 percent slopes, eroded	508	0.1
Or	Orthents-Water complex	4,032	1.2
Os	Orthents, steep	731	0.2
Pt	Pits, gravel	213	0.1
Ro	Roellen silty clay	6,150	1.8
Sc	Sharkey silty clay loam	34,046	9.8
Sh	Sharkey clay	13,218	3.8
Sm	Sharkey-Steele complex	16,088	4.6
So	Sikeston loam	6,513	1.9
Wd	Wardell loam	3,249	0.9
	Water	1,864	0.5
	Sewage lagoon	153	*
	Total	347,520	100.0

* Less than 0.1 percent.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates the crop is not suited to the soil or the crop generally is not grown on the soil]

Soil name and map symbol	Cotton lint	Soybeans	Corn	Winter wheat	Common bermuda-grass	Grass-legume hay	Peaches
	Lb	Bu	Bu	Bu	AUM*	Ton	Bu
Ag**: Alligator	550	35	---	28	7.5	3.7	---
Ak**: Alligator	550	33	---	30	7.5	3.5	---
Ba: Baldwin	600	33	---	30	7.0	3.7	---
BeA: Beulah	700	35	65	45	6.0	3.5	---
BeB: Beulah	500	20	50	30	5.0	3.3	---
Bk: Bosket	800	40	85	50	10	4.8	---
BrB: Broseley	750	30	65	40	---	3.5	---
Ca: Cairo	550	36	---	38	---	3.8	---
Ch: Calhoun	400	25	---	35	5.0	2.5	---
Cn: Canalou	600	26	70	40	---	3.3	---
Co: Collins	800	40	110	45	---	4.8	450
Ct: Cooter	540	28	---	---	---	3.4	---
Cw: Crowley	475	30	60	35	5.5	2.8	---
Db: Dubbs	850	40	90	45	---	4.8	---
De: Dubbs	738	35	---	38	---	4.0	---
Dn: Dundee	750	40	85	36	---	3.7	---
Ds**: Dundee	610	32	---	30	---	3.0	---
Fa: Falaya	750	40	100	40	7.0	3.5	425
Fg**: Farrenburg	700	36	90	42	---	4.3	---
Fo: Foley	---	30	---	27	6.0	2.0	---
Ft: Fountain	600	30	70	38	7.0	3.5	---

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Cotton lint	Soybeans	Corn	Winter wheat	Common bermuda-grass	Grass-legume hay	Peaches
	Lb	Bu	Bu	Bu	AUM*	Ton	Bu
Gd-------------------- Gideon	700	34	90	33	---	4.0	---
Jp-------------------- Jackport	500	35	---	30	7.0	3.5	---
Lf-------------------- Lafe	---	15	---	15	3.5	2.0	---
Ln-------------------- Lilbourn	600	26	72	25	---	3.9	---
LoB------------------- Loring	700	30	90	40	7.0	3.5	360
LoC------------------- Loring	650	25	70	35	7.0	3.5	300
LoD2------------------ Loring	450	15	55	25	5.5	2.8	277
Ma-------------------- Malden	700	25	65	40	5.5	3.0	---
MeC------------------- Memphis	700	30	80	35	7.0	3.5	540
MeD------------------- Memphis	600	25	65	25	6.0	3.0	500
MeE2------------------ Memphis	---	---	---	---	5.0	2.8	---
Or***. Orthents-Water complex							
Os***. Orthents, steep							
Pt***. Pits							
Ro-------------------- Roellen	500	33	---	27	---	3.5	---
Sc**, Sh**------------ Sharkey	650	40	---	32	7.5	3.7	---
Sm**------------------ Sharkey	533	33	---	30	7.5	3.5	---
So-------------------- Sikeston	675	40	96	40	---	4.3	---
Wd-------------------- Wardell	735	36	95	38	---	4.4	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.
** Yields are for areas protected from flooding.
*** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)			
		Erosion (e)	Wetness (w)	Soil problem (s)	Climate (c)
		Acres	Acres	Acres	Acres
I	50,454	---	---	---	---
II	111,685	1,524	87,045	23,116	---
III	174,409	4,398	115,011	55,000	---
IV	3,471	3,049	---	422	---
V	---	---	---	---	---
VI	508	508	---	---	---
VII	---	---	---	---	---
VIII	---	---	---	---	---

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that the information was not available]

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
Ag: Alligator	2w	Slight	Severe	Moderate	Severe	Eastern cottonwood	95	Eastern cottonwood, green ash, sweetgum, American sycamore.
						Green ash	80	
						Water oak	90	
						Sweetgum	90	
Ak*:								
Alligator	2w	Slight	Severe	Moderate	Severe	Eastern cottonwood	95	Eastern cottonwood, green ash, sweetgum, American sycamore.
						Green ash	80	
						Water oak	90	
						Sweetgum	90	
Steele	3s	Slight	Slight	Moderate	Slight	Eastern cottonwood	90	Eastern cottonwood, pin oak.
						Pin oak	80	
Ba: Baldwin	2w	Slight	Severe	Moderate	Severe	Green ash	80	Eastern cottonwood, sweetgum, American sycamore, green ash.
						Eastern cottonwood	100	
						Water oak	90	
						Pecan	---	
						Sweetgum	90	
						American sycamore	---	
BeA, BeB: Beulah	2o	Slight	Slight	Slight	Moderate	Eastern cottonwood	100	Eastern cottonwood, cherrybark oak, Nuttall oak, Shumard oak, Scotch pine,** willow oak, American sycamore.
						Cherrybark oak	90	
						Nuttall oak	90	
						Water oak	90	
						Willow oak	---	
						American sycamore	---	
Bk: Bosket	2o	Slight	Slight	Slight	Moderate	Eastern cottonwood	100	Eastern cottonwood, green ash, sweetgum, cherrybark oak, yellow-poplar, willow oak, Shumard oak, American sycamore.
						Green ash	80	
						Sweetgum	90	
						Cherrybark oak	90	
						Water oak	90	
						Willow oak	90	
BrB: Broseley	3s	Slight	Slight	Moderate	Slight	Eastern cottonwood	90	Eastern cottonwood, pin oak, Scotch pine.**
						Pin oak	80	
Ca: Cairo	2w	Slight	Severe	Severe	Severe	Pin oak	90	Pin oak, baldcypress, eastern cottonwood, red maple, green ash.
						Baldcypress	---	
						Swamp white oak	---	
						Eastern cottonwood	---	
						Green ash	---	
Ch: Calhoun	3w	Slight	Severe	Moderate	Severe	Loblolly pine	84	Loblolly pine, pin oak, sweetgum.
						Willow oak	---	
						Sweetgum	---	
						Pin oak		
Cn: Canalou	3s	Slight	Slight	Moderate	Slight	Eastern cottonwood	86	Eastern cottonwood, pin oak, sweetgum, shortleaf pine, American sycamore, eastern white pine, Scotch pine.**
						Pin oak	80	
						Black oak	70	
						Sweetgum	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Potential productivity: Common trees	Site index	Trees to plant
Co----------------- Collins	1o	Slight	Slight	Slight	Severe	Green ash----------- Eastern cottonwood-- Cherrybark oak------ Yellow-poplar-------	95 115 110 110	Green ash, eastern cottonwood, cherrybark oak, yellow-poplar, pecan.
Ct----------------- Cooter	3c	Slight	Moderate	Severe	Slight	Eastern cottonwood-- Pin oak------------- Baldcypress---------	95 80 ---	Eastern cottonwood, pin oak, baldcypress.
Cw----------------- Crowley	3w	Slight	Severe	Moderate	Slight	Pin oak------------- Red oak------------- Willow oak----------	80 70 80	Pin oak, loblolly pine.
Db----------------- Dubbs	2o	Slight	Slight	Slight	Moderate	Cherrybark oak------ Eastern cottonwood-- Green ash----------- Nuttall oak--------- Shumard oak--------- Sweetgum------------ Water oak----------- Willow oak---------- Pecan---------------	100 100 80 95 100 95 90 95 ---	Eastern cottonwood, green ash, Nuttall oak, sweetgum, American sycamore, yellow-poplar.
De*:								
Dubbs-------------	2o	Slight	Slight	Slight	Moderate	Cherrybark oak------ Eastern cottonwood-- Green ash----------- Nuttall oak--------- Shumard oak--------- Sweetgum------------ Water oak----------- Willow oak---------- Pecan---------------	100 100 80 95 100 95 90 95 ---	Eastern cottonwood, green ash, Nuttall oak, sweetgum, American sycamore, yellow-poplar.
Silverdale--------	3s	Slight	Slight	Moderate	Moderate	Shortleaf pine------ Sweetgum------------ Black oak----------- Pin oak-------------	70 80 70 80	Shortleaf pine, Scotch pine,** eastern white pine, eastern cottonwood, sweetgum, American sycamore, pecan.
Dn----------------- Dundee	2w	Slight	Moderate	Slight	Moderate	Cherrybark oak------ Eastern cottonwood-- Sweetgum------------ Water oak-----------	105 100 100 95	Cherrybark oak, eastern cottonwood, sweetgum, American sycamore, yellow-poplar.
Ds*:								
Dundee------------	2w	Slight	Moderate	Slight	Moderate	Cherrybark oak------ Eastern cottonwood-- Sweetgum------------ Water oak-----------	105 100 100 95	Cherrybark oak, eastern cottonwood, sweetgum, American sycamore, yellow-poplar.
Silverdale--------	3s	Slight	Slight	Moderate	Moderate	Shortleaf pine------ Sweetgum------------ Black oak----------- Pin oak-------------	70 80 70 80	Shortleaf pine, Scotch pine,** eastern white pine, eastern cottonwood, sweetgum, American sycamore, pecan.
Fa----------------- Falaya	1w	Slight	Moderate	Slight	Moderate	Green ash----------- Eastern cottonwood-- Cherrybark oak------ Nuttall oak--------- Water oak-----------	92 100 102 109 102	Green ash, eastern cottonwood, cherrybark oak, Nuttall oak, sweetgum, yellow-poplar, American sycamore.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
Fg: Farrenburg	2o	Slight	Slight	Slight	Moderate	Eastern cottonwood Pin oak Sweetgum Green ash Cherrybark oak	96 86 --- --- ---	Eastern cottonwood, pin oak, American sycamore, green ash, sweetgum, yellow-poplar.
Fo: Foley	3w	Slight	Severe	Moderate	Severe	Black oak Post oak	60 ---	
Ft: Fountain	2w	Slight	Severe	Moderate	Severe	Pin oak Sweetgum Water oak	90 --- ---	Eastern cottonwood, sweetgum, loblolly pine, pin oak.
Gd: Gideon	2w	Slight	Severe	Moderate	Severe	Eastern cottonwood Pin oak Baldcypress Sweetgum	96 86 --- 90	Eastern cottonwood, pin oak, American sycamore, water oak, sweetgum.
Jp: Jackport	2w	Slight	Severe	Moderate	Severe	Green ash Cherrybark oak Water oak Willow oak Sweetgum	80 90 90 90 90	Green ash, eastern cottonwood, Nuttall oak, willow oak, sweetgum, American sycamore.
Ln: Lilbourn	3o	Slight	Slight	Slight	Slight	Eastern cottonwood Pin oak	90 80	Eastern cottonwood, pin oak, American sycamore, sweetgum.
LoB, LoC, LoD2: Loring	3o	Slight	Slight	Slight	Severe	Cherrybark oak Sweetgum Southern red oak Loblolly pine Black oak White oak	86 90 74 85 --- ---	Loblolly pine, yellow-poplar, southern red oak, shortleaf pine, sweetgum.
Ma: Malden	3s	Slight	Slight	Moderate	Moderate	Shortleaf pine	70	Shortleaf pine, eastern white pine, Scotch pine,** black oak, American sycamore.
MeC, MeD: Memphis	2o	Slight	Slight	Slight	Moderate	Cherrybark oak Loblolly pine Sweetgum White oak Yellow-poplar	90 90 90 90 ---	Black walnut, cherrybark oak, loblolly pine, sweetgum, yellow-poplar, shortleaf pine.
MeE2: Memphis	2r	Moderate	Moderate	Moderate	Moderate	Cherrybark oak Loblolly pine Sweetgum White oak Yellow-poplar	90 90 90 90 ---	Black walnut, white oak, loblolly pine, sweetgum, yellow-poplar, shortleaf pine.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
Ro------------------ Roellen	2w	Slight	Severe	Severe	Severe	Eastern cottonwood-- Sweetgum------------ Water oak----------- Cherrybark oak------	100 90 90 90	Eastern cottonwood, sweetgum, American sycamore.
Sc, Sh------------- Sharkey	2w	Slight	Severe	Moderate	Severe	Green ash----------- Eastern cottonwood-- Cherrybark oak------ Sweetgum------------ Water oak----------- Pecan--------------- American sycamore--- Baldcypress---------	85 100 90 90 --- --- --- ---	Eastern cottonwood, American sycamore, sweetgum.
Sm*: Sharkey-----------	2w	Slight	Severe	Moderate	Severe	Green ash----------- Eastern cottonwood-- Cherrybark oak------ Sweetgum------------ Water oak----------- Pecan--------------- American sycamore--- Baldcypress---------	85 100 90 90 --- --- --- ---	Eastern cottonwood, American sycamore, sweetgum.
Steele------------	3s	Slight	Slight	Moderate	Slight	Eastern cottonwood-- Pin oak-------------	90 80	Eastern cottonwood, pin oak.
So----------------- Sikeston	2w	Slight	Severe	Moderate	Severe	Eastern cottonwood-- Pin oak------------- Baldcypress--------- Sweetgum------------	96 86 --- ---	Eastern cottonwood, pin oak, American sycamore, water oak, sweetgum.
Wd----------------- Wardell	3w	Slight	Severe	Moderate	Severe	Eastern cottonwood-- Pin oak------------- Sweetgum------------	90 80 ---	Eastern cottonwood, pin oak, American sycamore, water oak, sweetgum.

* See description of the map unit for composition and behavior characteristics of the map unit.
** Scotch pine for Christmas tree plantings.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

[The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil]

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
Ag------------------ Alligator	---	Amur honeysuckle, medium purple willow, Tatarian honeysuckle.	Eastern redcedar, oriental arborvitae.	Green ash, pin oak, sweetgum.	European alder, eastern cottonwood, American sycamore.
Ak*:					
Alligator part---	---	Amur honeysuckle, medium purple willow, Tatarian honeysuckle.	Eastern redcedar, oriental arborvitae.	Green ash, pin oak, sweetgum.	European alder, eastern cottonwood, American sycamore.
Steele part------	Silky dogwood-----	Amur honeysuckle, autumn olive.	Amur maple, eastern redcedar, oriental arborvitae.	Shortleaf pine, eastern white pine, Scotch pine, green ash.	Silver maple, European alder.
Ba------------------ Baldwin	---	Amur honeysuckle, medium purple willow, Tatarian honeysuckle.	Eastern redcedar, oriental arborvitae.	Green ash, pin oak, sweetgum.	European alder, eastern cottonwood, American sycamore.
BeA, BeB---------- Beulah	Silky dogwood-----	Amur honeysuckle, autumn-olive.	Amur maple, eastern redcedar, oriental arborvitae.	Shortleaf pine, eastern white pine.	Silver maple, European alder.
Bk------------------ Bosket	Silky dogwood-----	Amur honeysuckle, autumn-olive.	Eastern redcedar, oriental arborvitae, Amur maple.	Green ash, shortleaf pine, Norway spruce.	Eastern white pine, pin oak.
BrB---------------- Broseley	Silky dogwood-----	Amur honeysuckle, Russian-olive, autumn-olive.	Amur maple, eastern redcedar, oriental arborvitae.	Shortleaf pine, eastern white pine, Scotch pine, green ash.	Silver maple, European alder.
Ca------------------ Cairo	---	Amur honeysuckle, medium purple willow, Tatarian honeysuckle.	Eastern redcedar, oriental arborvitae.	Green ash, pin oak, sweetgum.	European alder, eastern cottonwood, American sycamore.
Ch------------------ Calhoun	---	Amur honeysuckle, medium purple willow, Tatarian honeysuckle.	Eastern redcedar, oriental arborvitae.	Green ash, pin oak, sweetgum.	European alder, eastern cottonwood, American sycamore.
Cn------------------ Canalou	Silky dogwood-----	Amur honeysuckle, Russian-olive, autumnn-olive.	Amur maple, eastern redcedar, oriental arborvitae.	Shortleaf pine, eastern white pine, Scotch pine, green ash.	Silver maple, European alder.
Co------------------ Collins	Silky dogwood-----	Amur honeysuckle, autumn-olive.	Eastern redcedar, oriental arborvitae, Amur maple.	Green ash, shortleaf pine, Norway spruce.	Eastern white pine, pin oak, European alder.
Ct------------------ Cooter	Silky dogwood-----	Amur honeysuckle, Amur privet, autumn-olive.	Amur maple, eastern redcedar, oriental arborvitae.	Shortleaf pine, eastern white pine, Scotch pine, green ash.	Silver maple, European alder.

See footnote at end of table.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of-- <8	8-15	16-25	26-35	>35
Cw: Crowley	Silky dogwood	Amur honeysuckle, autumn-olive.	Eastern redcedar, oriental arborvitae.	Green ash, loblolly pine, pin oak, sweetgum.	European alder, silver maple, eastern cottonwood.
Db: Dubbs	Silky dogwood	Amur honeysuckle, autumn-olive.	Eastern redcedar, oriental arborvitae, Amur maple.	Green ash, shortleaf pine, Norway spruce.	Eastern white pine, pin oak, European alder.
De*: Dubbs part	Silky dogwood	Amur honeysuckle, autumn-olive.	Eastern redcedar, oriental arborvitae, Amur maple.	Green ash, shortleaf pine, Norway spruce.	Eastern white pine, pin oak, European alder.
Silverdale part	Silky dogwood	Amur honeysuckle autumn-olive.	Amur maple, eastern redcedar, oriental arborvitae.	Shortleaf pine, eastern white pine, Scotch pine, green ash.	Silver maple, European alder.
Dn: Dundee	Silky dogwood	Amur honeysuckle, autumn-olive.	Eastern redcedar, oriental arborvitae.	Green ash, loblolly pine, pin oak, sweetgum.	European alder, silver maple, eastern cottonwood.
Ds*: Dundee part	Silky dogwood	Amur honeysuckle, autumn-olive.	Eastern redcedar, oriental arborvitae.	Green ash, loblolly pine, pin oak, sweetgum.	European alder, silver maple, eastern cottonwood.
Silverdale part	Silky dogwood	Amur honeysuckle, autumn-olive.	Amur maple, eastern redcedar, oriental arborvitae.	Shortleaf pine, eastern white pine, Scotch pine, green ash.	Silver maple, European alder
Fa: Falaya	Silky dogwood	Amur honeysuckle, autumn-olive.	Eastern redcedar, oriental arborvitae.	Green ash, pin oak, shortleaf pine.	European alder, silver maple, eastern cottonwood.
Fg: Farrenburg	Silky dogwood	Amur honeysuckle, Amur privet, autumn-olive.	Eastern redcedar, oriental arborvitae, Amur maple.	Green ash, shortleaf pine, Norway spruce.	Eastern white pine, pin oak, European alder.
Fo. Foley					
Ft: Fountain	---	Amur honeysuckle, medium purple willow, Tatarian honeysuckle.	Eastern redcedar, oriental arborvitae.	Green ash, pin oak, sweetgum.	European alder, eastern cottonwood, American sycamore.
Gd: Gideon	---	Tatarian honeysuckle, Amur honeysuckle, medium purple willow.	Eastern redcedar, oriental arborvitae.	Green ash, pin oak, sweetgum.	European alder, eastern cottonwood, American sycamore.
Jp: Jackport	---	Amur honeysuckle, medium purple willow, Tatarian honeysuckle.	Eastern redcedar, oriental arborvitae.	Green ash, pin oak, sweetgum.	European alder, eastern cottonwood, American sycamore.

See footnote at end of table.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
Lf. Lafe					
Ln------------------- Lilbourn	Silky dogwood-----	Amur honeysuckle, autumn-olive.	Eastern redcedar, oriental arborvitae.	Green ash, loblolly pine, pin oak, sweetgum.	European alder, silver maple, eastern cottonwood.
LoB, LoC, LoD2---- Loring	Silky dogwood-----	Amur honeysuckle, autumn-olive.	Amur maple, eastern redcedar, oriental arborvitae.	Shortleaf pine, eastern white pine, Scotch pine, green ash.	Silver maple, European alder.
Ma------------------- Malden	Silky dogwood-----	Amur honeysuckle, autumn-olive.	Amur maple, eastern redcedar, oriental arborvitae.	Shortleaf pine, eastern white pine, Scotch pine, green ash.	Silver maple, European alder.
MeC, MeD, MeE2---- Memphis	Silky dogwood-----	Amur honeysuckle, autumn-olive.	Eastern redcedar, oriental arborvitae, Amur maple.	Green ash, shortleaf pine, Norway spruce.	Eastern white pine, pin oak, European alder.
Or*, Os*. Orthents					
Pt*. Pits					
Ro------------------- Roellen	---	Amur honeysuckle, medium purple willow, Tatarian honeysuckle.	Eastern redcedar, oriental arborvitae.	Green ash, pin oak, sweetgum.	European alder, eastern cottonwood, American sycamore.
Sc, Sh-------------- Sharkey	---	Amur honeysuckle, medium purple willow, Tatarian honeysuckle.	Eastern redcedar, oriental arborvitae.	Green ash, pin oak, sweetgum.	European alder, eastern cottonwood, American sycamore.
Sm*:					
Sharkey part-----	---	Amur honeysuckle, medium purple willow, Tatarian honeysuckle.	Eastern redcedar, oriental arborvitae.	Green ash, pin oak, sweetgum.	European alder, eastern cottonwood, American sycamore.
Steele part------	Silky dogwood-----	Amur honeysuckle, autumn-olive.	Amur maple, eastern redcedar, oriental arborvitae.	Shortleaf pine, eastern white pine, Scotch pine, green ash.	Silver maple, European alder.
So------------------- Sikeston	---	Tatarian honeysuckle, Amur honeysuckle, medium purple willow.	Eastern redcedar, oriental arborvitae.	Green ash, pin oak, sweetgum.	European alder, eastern cottonwood, American sycamore.
Wd------------------- Wardell	---	Tatarian honeysuckle, Amur honeysuckle, medium purple willow.	Eastern redcedar, oriental arborvitae.	Green ash, pin oak, sweetgum.	European alder, eastern cottonwood, American sycamore.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Ag: Alligator	Severe: too clayey, wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, corrosive.	Severe: shrink-swell, wetness.
Ak*:					
Alligator	Severe: too clayey, wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, corrosive.	Severe: shrink-swell, wetness.
Steele	Severe: wetness.	Severe: floods, shrink-swell, low strength.	Severe: floods, wetness, shrink-swell.	Severe: floods, shrink-swell, low strength.	Moderate: wetness, floods.
Ba: Baldwin	Severe: wetness, too clayey.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.
BeA, BeB: Beulah	Severe: cutbanks cave, too sandy.	Slight	Slight	Slight	Slight.
Bk: Bosket	Slight	Slight	Slight	Slight	Moderate: low strength.
BrB: Broseley	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.
Ca: Cairo	Severe: wetness, floods.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, low strength.
Ch: Calhoun	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Cn: Canalou	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Co: Collins	Moderate: floods, wetness.	Severe: floods.	Severe: floods, wetness.	Severe: floods.	Moderate: floods, low strength.
Ct: Cooter	Severe: wetness, cutbanks cave.	Severe: floods.	Severe: wetness, floods.	Severe: floods.	Severe: floods.
Cw: Crowley	Severe: wetness, too clayey.	Severe: shrink-swell, low strength, wetness.	Severe: shrink-swell, low strength, wetness.	Severe: shrink-swell, low strength, wetness.	Severe: low strength, shrink-swell.
Db: Dubbs	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
De*:					
Dubbs	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.
Silverdale	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Slight.
Dn Dundee	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.
Ds*:					
Dundee	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.
Silverdale	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Slight.
Fa Falaya	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
Fg Farrenburg	Severe: cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Fo Foley	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.
Ft Fountain	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Gd Gideon	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness, low strength.
Jp Jackport	Severe: wetness, too clayey.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.
Lf Lafe	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.
Ln Lilbourn	Severe: wetness, cutbanks cave.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Moderate: floods, wetness.
LoB Loring	Moderate: low strength, wetness.	Moderate: low strength.	Moderate: low strength.	Moderate: low strength.	Moderate: low strength.
LoC Loring	Moderate: low strength, wetness.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Moderate: low strength.
LoD2 Loring	Moderate: slope, wetness, low strength.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Moderate: slope, low strength.
Ma Malden	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
MeC---------------- Memphis	Slight------------	Moderate: low strength.	Moderate: low strength.	Moderate: low strength, slope.	Moderate: low strength.
MeD---------------- Memphis	Moderate: slope.	Moderate: low strength, slope.	Moderate: low strength, slope.	Severe: slope.	Moderate: low strength, slope.
MeE2--------------- Memphis	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Or*, Os*. Orthents-Water complex					
Os*. Orthents, steep					
Pt*. Pits					
Ro----------------- Roellen	Severe: wetness, too clayey, floods.	Severe: wetness, floods, shrink-swell.	Severe: shrink-swell, floods, wetness.	Severe: shrink-swell, floods, wetness.	Severe: shrink-swell, wetness.
Sc, Sh------------- Sharkey	Severe: wetness, too clayey.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.
Sm*:					
Sharkey-----------	Severe: wetness, too clayey.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.
Steele------------	Severe: wetness.	Severe: floods, shrink-swell, low strength.	Severe: floods, wetness, shrink-swell.	Severe: floods, shrink-swell, low strength.	Moderate: wetness, floods.
So----------------- Sikeston	Severe: floods, wetness, cutbanks cave.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness, low strength.
Wd----------------- Wardell	Severe: wetness.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, shrink-swell.	Severe: wetness, low strength.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ag: Alligator	Severe: percs slowly, wetness.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.
Ak*:					
Alligator	Severe: percs slowly, wetness.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.
Steele	Severe: percs slowly, wetness.	Slight	Severe: too clayey, seepage, wetness.	Severe: seepage.	Poor: too clayey.
Ba: Baldwin	Severe: wetness, percs slowly.	Slight	Severe: too clayey, wetness.	Severe: wetness.	Poor: too clayey, wetness.
BeA, BeB: Beulah	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Fair: too sandy.
Bk: Bosket	Slight	Moderate: slope, seepage.	Severe: seepage.	Slight	Good.
BrB: Broseley	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
Ca: Cairo	Severe: percs slowly, wetness, floods.	Severe: seepage, wetness, floods.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Poor: too clayey, wetness.
Ch: Calhoun	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Cn: Canalou	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Fair: wetness.
Co: Collins	Moderate: floods, wetness.	Moderate: seepage, wetness.	Moderate: floods.	Moderate: floods, wetness.	Good.
Ct: Cooter	Severe: wetness, floods.	Severe: wetness, seepage, floods.	Severe: wetness, seepage, floods.	Severe: wetness, seepage, floods.	Poor: too sandy.
Cw: Crowley	Severe: percs slowly, wetness.	Slight	Severe: too clayey, wetness.	Severe: wetness.	Poor: too clayey.
Db: Dubbs	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Fair: too clayey.
De*:					
Dubbs	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Fair: too clayey.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
De*:					
Silverdale	Severe: wetness.	Severe: wetness, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
Dn Dundee	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey.
Ds*:					
Dundee	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey.
Silverdale	Severe: wetness.	Severe: wetness, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
Fa Falaya	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.
Fg Farrenburg	Severe: wetness.	Severe: wetness, seepage.	Severe: seepage.	Severe: seepage.	Fair: wetness.
Fo Foley	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
Ft Fountain	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Gd Gideon	Severe: floods, wetness, percs slowly.	Severe: floods, wetness.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Poor: wetness.
Jp Jackport	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey.
Lf Lafe	Severe: percs slowly, wetness.	Slight	Moderate: too clayey, wetness.	Moderate: wetness.	Poor: hard to pack, thin layer.
Ln Lilbourn	Severe: wetness.	Severe: wetness, seepage, floods.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness.
LoB Loring	Severe: percs slowly.	Moderate: slope.	Slight	Slight	Good.
LoC Loring	Severe: percs slowly.	Severe: slope.	Slight	Slight	Good.
LoD2 Loring	Severe: percs slowly.	Severe: slope.	Slight	Moderate: slope.	Fair: slope.
Ma Malden	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
MeC Memphis	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: too clayey.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MeD: Memphis	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.	Fair: too clayey, slope.
MeE2: Memphis	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Or*. Orthents-Water complex					
Os*. Orthents, steep					
Pt*. Pits					
Ro: Roellen	Severe: percs slowly, floods, wetness.	Slight	Severe: wetness, too clayey, floods.	Severe: wetness, floods.	Poor: wetness, too clayey.
Sc, Sh: Sharkey	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.
Sm*:					
Sharkey	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.
Steele	Severe: percs slowly, wetness.	Slight	Severe: too clayey, seepage, wetness.	Severe: seepage.	Poor: too clayey.
So: Sikeston	Severe: floods, wetness, percs slowly.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Poor: wetness.
Wd: Wardell	Severe: wetness, percs slowly.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ag: Alligator	Poor: shrink-swell, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey.
Ak*:				
Alligator	Poor: shrink-swell, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey.
Steele	Poor: shrink-swell, low strength.	Poor: thin layer, excess fines.	Unsuited: excess fines.	Fair: thin layer.
Ba: Baldwin	Poor: wetness, low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
BeA, BeB: Beulah	Good	Poor: excess fines.	Unsuited: excess fines.	Good.
Bk: Bosket	Fair: low strength.	Poor: excess fines.	Unsuited: excess fines.	Good.
BrB: Broseley	Fair: low strength.	Poor: excess fines.	Unsuited: excess fines.	Fair: too sandy.
Ca: Cairo	Poor: wetness, shrink-swell, low strength.	Poor: excess fines.	Unsuited: excess fines.	Poor: too clayey, wetness, area reclaim.
Ch: Calhoun	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
Cn: Canalou	Fair: wetness.	Fair: excess fines.	Unsuited: excess fines.	Poor: too sandy.
Co: Collins	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Ct: Cooter	Fair: wetness.	Poor: excess fines.	Unsuited: excess fines.	Poor: too clayey.
Cw: Crowley	Poor: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, wetness.
Db: Dubbs	Fair: shrink-swell, low strength.	Poor: excess fines.	Poor: excess fines.	Fair: thin layer, too clayey.
De*:				
Dubbs	Fair: shrink-swell, low strength.	Poor: excess fines.	Poor: excess fines.	Fair: thin layer, too clayey.
Silverdale	Good	Fair: excess fines.	Unsuited: excess fines.	Fair: too sandy, thin layer.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Dn: Dundee	Fair: wetness, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Ds*:				
Dundee	Fair: wetness, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Silverdale	Good	Fair: excess fines.	Unsuited: excess fines.	Fair: too sandy, thin layer.
Fa: Falaya	Fair: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Fg: Farrenburg	Fair: low strength.	Poor: excess fines.	Unsuited: excess fines.	Good.
Fo: Foley	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, area reclaim.
Ft: Fountain	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
Gd: Gideon	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
Jp: Jackport	Poor: wetness, low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, too clayey.
Lf: Lafe	Poor: area reclaim, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: area reclaim, excess sodium, thin layer.
Ln: Lilbourn	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
LoB, LoC, LoD2: Loring	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Ma: Malden	Good	Fair: excess fines.	Unsuited: excess fines.	Poor: too sandy.
MeC: Memphis	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
MeD: Memphis	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
MeE2: Memphis	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Or*. Orthents-Water complex				
Os*. Orthents, steep				

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Pt*. Pits				
Ro------------------- Roellen	Poor: shrink-swell, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey, wetness.
Sc, Sh--------------- Sharkey	Poor: too clayey, shrink-swell, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, too clayey.
Sm*:				
Sharkey--------------	Poor: too clayey, shrink-swell, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, too clayey.
Steele---------------	Poor: shrink-swell, low strength.	Poor: thin layer, excess fines.	Unsuited: excess fines.	Fair: thin layer.
So------------------- Sikeston	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
Wd------------------- Wardell	Poor: wetness, low strength.	Poor: excess fines.	Unsuited: excess fines.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Ag: Alligator	Favorable	Shrink-swell, compressible, unstable fill.	Wetness, percs slowly.	Slow intake, wetness, percs slowly.	Not needed	Percs slowly, wetness.
Ak*:						
Alligator	Favorable	Shrink-swell, compressible, unstable fill.	Wetness, percs slowly.	Slow intake, wetness, percs slowly.	Not needed	Percs slowly, wetness.
Steele	Favorable	Hard to pack, wetness.	Percs slowly	Soil blowing, wetness, percs slowly.	Not needed	Percs slowly.
Ba: Baldwin	Favorable	Shrink-swell, low strength, compressible.	Percs slowly	Percs slowly, slow intake, wetness.	Not needed	Wetness.
BeA, BeB: Beulah	Seepage	Seepage, piping.	Not needed	Complex slope, fast intake.	Complex slope, too sandy.	Slope.
Bk: Bosket	Seepage	Piping, unstable fill.	Not needed	Favorable	Not needed	Favorable.
BrB: Broseley	Seepage	Piping	Not needed	Fast intake, soil blowing.	Too sandy, soil blowing.	Favorable.
Ca: Cairo	Seepage	Hard to pack, wetness.	Floods, percs slowly.	Wetness, slow intake, percs slowly.	Not needed	Wetness, percs slowly.
Ch: Calhoun	Favorable	Piping, low strength.	Percs slowly	Wetness, percs slowly.	Not needed	Wetness.
Cn: Canalou	Seepage	Seepage, wetness.	Favorable	Soil blowing, wetness, fast intake.	Not needed	Favorable.
Co: Collins	Seepage	Piping, unstable fill.	Cutbanks cave, floods.	Floods, wetness.	Not needed	Erodes easily.
Ct: Cooter	Seepage	Seepage, wetness, piping.	Percs slowly, floods.	Wetness, droughty, slow intake.	Not needed	Droughty.
Cw: Crowley	Favorable	Compressible, low strength.	Percs slowly	Slow intake, percs slowly.	Not needed	Favorable.
Db: Dubbs	Seepage	Thin layer, piping.	Not needed	Favorable	Not needed	Favorable.
De*:						
Dubbs	Seepage	Thin layer, piping.	Not needed	Favorable	Not needed	Favorable.
Silverdale	Seepage	Seepage, piping, wetness.	Favorable	Fast intake, wetness, soil blowing.	Not needed	Favorable.
Dn: Dundee	Seepage	Seepage, compressible, piping.	Favorable	Wetness, slow intake.	Not needed	Wetness, percs slowly.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Ds*:						
Dundee	Seepage	Seepage, compressible, piping.	Favorable	Wetness	Not needed	Wetness, percs slowly.
Silverdale	Seepage	Seepage, piping, wetness.	Favorable	Fast intake, wetness, soil blowing.	Not needed	Favorable.
Fa: Falaya	Seepage	Piping	Floods	Wetness, floods.	Not needed	Wetness, erodes easily.
Fg: Farrenburg	Seepage	Wetness	Favorable	Wetness, soil blowing.	Not needed	Favorable.
Fo: Foley	Favorable	Unstable fill, compressible, low strength.	Wetness, percs slowly.	Wetness, slow intake.	Not needed	Wetness.
Ft: Fountain	Favorable	Wetness	Favorable	Wetness	Not needed	Wetness.
Gd: Gideon	Seepage	Wetness	Favorable	Floods, wetness.	Not needed	Wetness.
Jp: Jackport	Favorable	Unstable fill, compressible, low strength.	Wetness, percs slowly.	Slow intake, wetness.	Not needed	Wetness.
Lf: Lafe	Favorable	Compressible, low strength, piping.	Cutbanks cave, excess sodium, percs slowly.	Droughty, excess sodium, slow intake.	Not needed	Excess sodium, percs slowly, wetness.
Ln: Lilbourn	Seepage	Wetness	Favorable	Wetness, soil blowing.	Not needed	Wetness.
LoB, LoC, LoD2: Loring	Seepage	Piping, low strength.	Not needed	Rooting depth, erodes easily, slope.	Erodes easily, slope.	Rooting depth, erodes easily, slope.
Ma: Malden	Seepage	Seepage, piping.	Not needed	Fast intake, soil blowing, droughty.	Too sandy, soil blowing.	Droughty.
MeC, MeD, MeE2: Memphis	Seepage	Favorable	Not needed	Erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
Or*. Orthents-Water complex						
Os*. Orthents, steep						
Pt*. Pits						
Ro: Roellen	Favorable	Compressible	Percs slowly, poor outlets.	Slow intake, wetness.	Not needed	Not needed.
Sc, Sh: Sharkey	Favorable	Low strength, compressible, shrink-swell.	Percs slowly	Percs slowly, slow intake, wetness.	Not needed	Wetness.
Sm*:						
Sharkey	Favorable	Low strength, compressible, shrink-swell.	Percs slowly	Percs slowly, slow intake, wetness.	Not needed	Wetness.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Sm*:						
Steele	Favorable	Hard to pack, wetness.	Percs slowly	Soil blowing, wetness, percs slowly.	Not needed	Percs slowly.
So: Sikeston	Seepage	Wetness	Floods	Floods, wetness.	Not needed	Wetness.
Wd: Wardell	Seepage	Wetness	Percs slowly	Wetness, percs slowly.	Not needed	Wetness, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Ag: Alligator	Severe: wetness, too clayey, percs slowly.	Severe: wetness, too clayey.	Severe: wetness, percs slowly, too clayey.	Severe: wetness, too clayey.
Ak*:				
Alligator	Severe: wetness, too clayey, percs slowly.	Severe: wetness, too clayey.	Severe: wetness, percs slowly, too clayey.	Severe: wetness, too clayey.
Steele	Severe: floods.	Moderate: wetness.	Moderate: wetness, percs slowly.	Slight.
Ba: Baldwin	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.
BeA: Beulah	Slight	Slight	Slight	Slight.
BeB: Beulah	Slight	Slight	Moderate: slope.	Slight.
Bk: Bosket	Slight	Slight	Slight	Slight.
BrB: Broseley	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.
Ca: Cairo	Severe: floods, wetness, percs slowly.	Severe: too clayey.	Severe: too clayey.	Severe: wetness, too clayey.
Ch: Calhoun	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Cn: Canalou	Moderate: wetness.	Moderate: wetness, too sandy.	Moderate: too sandy, wetness.	Moderate: too sandy.
Co: Collins	Slight	Slight	Slight	Slight.
Ct: Cooter	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.
Cw: Crowley	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.
Db: Dubbs	Slight	Slight	Slight	Slight.
De*:				
Dubbs	Slight	Slight	Slight	Slight.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
De*:				
Silverdale	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: too sandy, wetness.	Moderate: too sandy.
Dn: Dundee	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Ds*:				
Dundee	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, percs slowly.	Moderate: wetness.
Silverdale	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: too sandy, wetness.	Moderate: too sandy.
Fa: Falaya	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Fg: Farrenburg	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
Fo: Foley	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.
Ft: Fountain	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Gd: Gideon	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Jp: Jackport	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.
Lf: Lafe	Severe: dusty, percs slowly, wetness.	Moderate: dusty, wetness.	Severe: percs slowly, wetness.	Moderate: dusty, wetness.
Ln: Lilbourn	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
LoB: Loring	Slight	Slight	Moderate: slope.	Slight.
LoC: Loring	Slight	Slight	Severe: slope.	Slight.
LoD2: Loring	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Ma: Malden	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
MeC: Memphis	Slight	Slight	Severe: slope.	Slight.
MeD: Memphis	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
MeE2: Memphis	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Or*. Orthents-Water complex				
Os*. Orthents, steep				
Pt*. Pits				
Ro: Roellen	Severe: wetness, too clayey.	Severe: wetness, too clayey.	Severe: wetness, too clayey.	Severe: too clayey.
Sc, Sh: Sharkey	Severe: too clayey, percs slowly, wetness.	Severe: too clayey, wetness.	Severe: too clayey, percs slowly, wetness.	Severe: too clayey.
Sm*:				
Sharkey	Severe: too clayey, percs slowly, wetness.	Severe: too clayey, wetness.	Severe: too clayey, percs slowly, wetness.	Severe: too clayey.
Steele	Severe: floods.	Moderate: wetness.	Moderate: wetness, percs slowly.	Slight.
So: Sikeston	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Wd: Wardell	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements								Potential as habitat for		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Ag: Alligator	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
Ak*:											
Alligator	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
Steele	Poor	Fair	Good	Good	Good	Good	Poor	Poor	Poor	Good	Poor
Ba: Baldwin	Fair	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair
BeA, BeB: Beulah	Fair	Fair	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
Bk: Bosket	Good	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
BrB: Broseley	Poor	Fair	Good	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
Ca: Cairo	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair
Ch: Calhoun	Fair	Fair	Fair	Good	Fair	Fair	Good	Good	Fair	Good	Good
Cn: Canalou	Fair	Fair	Good	Good	Good	Good	Poor	Poor	Fair	Good	Poor
Co: Collins	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
Ct: Cooter	Fair	Fair	Poor	Good	Good	Good	Poor	Poor	Fair	Fair	Poor
Cw: Crowley	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
Db: Dubbs	Good	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
De*:											
Dubbs	Good	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
Silverdale	Poor	Fair	Good	Good	Good	Good	Poor	Poor	Fair	Good	Poor
Dn: Dundee	Fair	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
Ds*:											
Dundee	Fair	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
Silverdale	Poor	Fair	Good	Good	Good	Good	Poor	Poor	Fair	Good	Poor
Fa: Falaya	Fair	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
Fg: Farrenburg	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
Fo: Foley	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good

See footnote at end of table.

TABLE 14.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for: Openland wildlife	Woodland wildlife	Wetland wildlife
Ft----------------- Fountain	Fair	Fair	Fair	Good	Fair	Fair	Good	Good	Fair	Good	Good
Gd----------------- Gideon	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
Jp----------------- Jackport	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
Lf----------------- Lafe	Very poor	Very poor	Poor	Poor	Poor	Poor	Poor	Good	Very poor	Poor	Fair
Ln----------------- Lilbourn	Fair	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
LoB---------------- Loring	Good	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
LoC, LoD2---------- Loring	Fair	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Ma----------------- Malden	Poor	Fair	Good	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
MeC, MeD----------- Memphis	Fair	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
MeE2--------------- Memphis	Very poor	Poor	Good	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
Or*. Orthents-Water complex											
Os*. Orthents, steep											
Pt*. Pits											
Ro----------------- Roellen	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
Sc, Sh------------- Sharkey	Fair	Fair	Fair	Good	Fair	Fair	Good	Good	Fair	Good	Good
Sm*:											
Sharkey-----------	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Good	Good
Steele------------	Poor	Fair	Good	Good	Good	Good	Poor	Poor	Poor	Good	Poor
So----------------- Sikeston	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
Wd----------------- Wardell	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Ag----------------- Alligator	0-7	Silty clay loam	CH	A-7	0	100	100	95-100	90-100	52-75	30-45
	7-49	Silty clay, clay	CH	A-7	0	100	100	100	95-100	62-94	33-64
	49-78	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	95-100	62-94	33-64
Ak*:											
Alligator---------	0-7	Silty clay loam	CH	A-7	0	100	100	95-100	90-100	52-75	30-45
	7-49	Silty clay, clay	CH	A-7	0	100	100	100	95-100	62-94	33-64
	49-78	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	95-100	62-94	33-64
Steele------------	0-9	Loam, sandy loam	SM-SC, CL-ML, CL, SC	A-4, A-6	0	100	100	65-95	35-75	15-30	5-15
	9-25	Loamy sand------	SM	A-2	0	100	100	50-75	15-30	---	NP
	25-31	Loam, fine sandy loam.	ML	A-4, A-6, A-7	0	100	100	85-95	65-75	30-45	5-15
	31-85	Silty clay, clay.	CH, CL	A-7	0	100	100	95-100	85-95	45-80	30-50
Ba----------------- Baldwin	0-12	Silty clay loam	CL, CH	A-7-6, A-6	0	100	100	100	95-100	35-55	15-28
	12-24	Clay, silty clay	CH	A-7-6	0	95-100	95-100	95-100	90-100	51-75	25-45
	24-63	Clay, silty clay.	CH, CL	A-7-6, A-6	0	95-100	95-100	95-100	90-100	35-65	15-35
BeA, BeB----------- Beulah	0-7	Fine sandy loam	SM	A-2, A-4	0	100	100	75-100	25-45	---	NP
	7-35	Fine sandy loam, loam.	SM, ML	A-2, A-4	0	100	100	85-100	25-60	---	NP
	35-60	Loamy sand, sand, loamy fine sand.	SM	A-2, A-4	0	100	100	65-100	15-45	---	NP
Bk----------------- Bosket	0-18	Fine sandy loam	SM	A-2, A-4	0	100	100	75-100	25-45	<20	NP-3
	18-50	Sandy clay loam, clay loam, sandy loam.	SC, SM, CL, ML	A-2, A-4	0	100	100	85-100	30-70	25-40	5-17
	50-62	Fine sandy loam, sand, loamy fine sand.	SM	A-2, A-4	0	100	100	65-100	15-45	<20	NP-3
BrB---------------- Broseley	0-32	Loamy fine sand	SM	A-2, A-4	0	100	100	60-95	20-50	<20	NP-3
	32-56	Fine sandy loam, sandy clay loam.	SM, SC, SM-SC	A-4, A-6	0	100	100	65-95	36-50	20-35	2-15
	56-66	Stratified loamy sand to sandy loam.	SM, SM-SC	A-4, A-2	0	100	100	60-80	20-50	<25	NP-7
Ca----------------- Cairo	0-35	Silty clay------	CH	A-7	0	100	100	95-100	90-100	51-80	31-55
	35-60	Loamy fine sand, fine sand.	SM, SM-SC	A-2, A-4	0	100	65-100	50-80	15-45	15-30	NP-10

See footnote at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ch-----------------Calhoun	0-13	Silt loam--------	CL-ML, ML, CL	A-4	0	100	100	100	95-100	<31	NP-10
	13-51	Silty clay loam, silt loam.	CL	A-6	0	100	100	95-100	95-100	30-45	11-24
	51-66	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	25-40	5-20
Cn-----------------Canalou	0-24	Loamy fine sand	SM	A-2-4	0	100	100	50-75	15-30	---	NP
	24-39	Sandy loam-------	SM	A-4	0	100	100	65-95	35-50	---	NP
	39-70	Sand, loamy sand	SM, SP-SM	A-3, A-2-4	0	100	100	50-75	5-30	---	NP
Co-----------------Collins	0-6	Silt loam--------	ML, CL, CL-ML	A-4	0	100	100	85-100	70-90	<30	NP-8
	6-64	Silt loam, silt	ML, CL-ML	A-4	0	100	100	100	90-100	<35	NP-10
Ct-----------------Cooter	0-12	Silty clay-------	CH, CL	A-7	0	100	100	95-100	85-95	45-65	30-45
	12-60	Stratified loamy fine sand to sand.	SM	A-2	0	100	100	50-75	15-30	<15	NP-3
Cw-----------------Crowley	0-19	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	95-100	80-100	<30	NP-10
	19-51	Silty clay, silty clay loam.	CH, CL	A-7-6	0	100	100	95-100	85-100	41-60	20-35
	51-69	Silty clay loam, silty clay.	CL, CH	A-7-6, A-6	0	100	100	95-100	85-100	38-60	18-35
Db-----------------Dubbs	0-14	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	100	60-90	20-35	3-10
	14-47	Silty clay loam, clay loam, sandy clay loam.	CL	A-6, A-7	0	100	100	100	85-100	35-50	15-25
	47-60	Loamy sand, loamy fine sand.	SM	A-2-4	0	100	100	50-75	15-30	---	NP
De*:											
Dubbs--------------	0-14	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	100	60-90	20-35	3-10
	14-47	Silty clay loam, clay loam, sandy clay loam.	CL	A-6, A-7	0	100	100	100	85-100	35-50	15-25
	47-60	Loamy sand, loamy fine sand.	SM	A-2-4	0	100	100	50-75	15-30	---	NP
Silverdale---------	0-8	Loamy sand-------	SM	A-2-4	0	100	100	70-90	20-30	---	NP
	8-31	Sand, coarse sand.	SP-SM, SM	A-3, A-2-4	0	100	100	50-60	5-15	---	NP
	31-63	Silt loam, silty clay loam, loam.	CL	A-4, A-6	0	100	100	90-100	70-90	25-40	10-20
	63-70	Loamy sand, sand	SP-SM, SM	A-2-4	0	100	100	50-70	10-20	---	NP
Dn-----------------Dundee	0-13	Silt loam--------	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-98	20-35	4-11
	13-48	Loam, silty clay loam, clay loam.	CL	A-6, A-7	0	100	100	90-100	70-95	28-44	12-22
	48-66	Loam, very fine sandy loam, silt loam.	CL, CL-ML, ML	A-4	0	100	100	85-100	60-90	<30	NP-8

See footnote at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ds*:											
Dundee------------	0-13	Silt loam-------	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-98	20-35	4-11
	13-48	Loam, silty clay loam, clay loam.	CL	A-6, A-7	0	100	100	90-100	70-95	28-44	12-22
	48-66	Loam, very fine sandy loam, silt loam.	CL, CL-ML, ML	A-4	0	100	100	85-100	60-90	<30	NP-8
Silverdale---------	0-8	Loamy sand------	SM	A-2-4	0	100	100	70-90	20-30	---	NP
	8-31	Sand, coarse sand.	SP-SM, SM	A-3, A-2-4	0	100	100	50-60	5-15	---	NP
	31-63	Silt loam, silty clay loam, loam.	CL	A-4, A-6	0	100	100	90-100	70-90	25-40	10-20
	63-70	Loamy sand, sand	SP-SM, SM	A-2-4	0	100	100	50-70	10-20	---	NP
Fa----------------- Falaya	0-62	Silt loam-------	ML, CL-ML, CL	A-4	0	100	100	100	95-100	<30	NP-10
Fg----------------- Farrenburg	0-17	Fine sandy loam	SM, ML	A-4	0	100	100	70-95	40-65	<25	NP-3
	17-52	Clay loam, sandy clay loam, loam.	CL	A-6, A-7	0	100	100	80-100	52-85	35-45	20-30
	52-68	Stratified loamy sand to sand.	SM	A-2	0	100	100	50-75	15-30	<15	NP-3
Fo----------------- Foley	0-11	Silt loam-------	ML, CL, CL-ML	A-4, A-6, A-7	0	100	100	95-100	70-100	25-45	5-20
	11-18	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	90-100	30-49	11-25
	18-69	Silty clay loam, silt loam.	CL, CH	A-6, A-7	0	100	100	95-100	90-100	40-60	18-32
	69-71	Silt loam-------	CL	A-6, A-7	0	100	100	95-100	85-100	30-45	11-20
Ft----------------- Fountain	0-12	Silt loam-------	CL-ML, ML	A-4	0	100	100	100	95-100	<27	NP-7
	12-35	Silty clay loam, silt loam.	CL	A-6	0	95-100	90-100	90-100	80-100	32-40	11-18
	35-62	Silt loam-------	CL-ML, CL	A-4, A-6	0	95-100	90-100	90-100	80-100	25-36	5-14
Gd----------------- Gideon	0-8	Loam------------	SC, CL	A-6, A-4	0	100	100	75-100	45-80	22-35	8-15
	8-30	Clay loam, sandy clay loam.	SC, CL	A-6, A-7	0	100	100	80-100	40-70	35-45	20-30
	30-48	Clay loam-------	CL	A-6, A-7	0	100	100	80-100	50-85	35-45	20-30
	48-73	Stratified sandy clay loam to loamy sand.	CL, SM, SC, SM-SC	A-2, A-4, A-6	0	100	100	50-90	15-55	<30	NP-15
Jp----------------- Jackport	0-9	Silty clay loam	CL, CH	A-6, A-7-6	0	100	100	95-100	85-100	30-55	12-30
	9-26	Silty clay, clay	CH	A-7-6	0	100	100	95-100	90-100	51-85	25-55
	26-55	Clay------------	CH	A-7-5, A-7-6	0	100	100	95-100	90-100	65-85	35-55
	55-65	Silty clay, silty clay loam.	CH	A-7-6	0	100	100	95-100	90-100	51-85	25-55
	65-73	Silt loam-------	CL	A-7-5,	0	100	100	95-100	90-100	30-45	11-20

See footnote at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Lf----------------- Lafe	0-6	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	95-100	90-100	<30	NP-10
	6-43	Silt loam, silty clay loam.	CL	A-4, A-6, A-7	0	100	100	95-100	90-100	25-45	8-25
	43-70	Silt loam, silty clay loam.	ML, CL, SM	A-4, A-6, A-7	0	100	100	90-100	45-100	20-65	1-25
Ln----------------- Lilbourn	0-15	Fine sandy loam	ML, SM	A-4	0	100	100	85-100	40-65	<20	NP-4
	15-26	Loamy sand, fine sandy loam, sandy loam.	ML, SM	A-4, A-2-4	0	100	100	75-100	30-65	<20	NP-4
	26-38	Loam, silt loam, sandy clay loam.	CL	A-6, A-7	0	100	100	95-100	80-95	38-48	15-25
	38-67	Stratified very fine sandy loam to sand.	SM, SM-SC	A-4, A-2	0	100	100	85-100	15-50	<25	NP-7
LoB, LoC----------- Loring	0-11	Silt loam--------	ML, CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	20-35	4-15
	11-22	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	95-100	90-100	35-45	15-25
	22-34	Silt loam, silty clay loam.	CL, ML	A-4, A-6, A-7	0	100	100	95-100	90-100	30-45	8-18
	34-67	Silt loam--------	CL, CL-ML, ML	A-4, A-6	0	100	100	95-100	90-100	25-40	6-15
LoD2--------------- Loring	0-5	Silt loam--------	ML, CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	20-35	4-15
	5-12	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	95-100	90-100	35-45	15-25
	12-20	Silt loam, silty clay loam.	CL, ML	A-4, A-6, A-7	0	100	100	95-100	90-100	30-45	8-18
	20-60	Silt loam--------	CL, CL-ML, ML	A-4, A-6	0	100	100	95-100	90-100	25-40	6-15
Ma----------------- Malden	0-4	Fine sand--------	SM, SP-SM	A-2-4, A-3	0	100	100	55-75	10-20	---	NP
	4-50	Fine sand, sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	100	100	55-90	10-30	---	NP
	50-69	Fine sand, sand	SM, SP-SM	A-2-4, A-3	0	100	100	55-75	10-25	---	NP
MeC, MeD----------- Memphis	0-13	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	100	90-100	<30	NP-10
	13-62	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	90-100	35-48	15-25
	62-77	Silt loam--------	ML, CL	A-4, A-6	0	100	100	100	90-100	30-40	6-15
MeE2--------------- Memphis	0-4	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	100	90-100	<30	NP-10
	4-40	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	90-100	35-48	15-25
	40-60	Silt loam--------	ML, CL	A-4, A-6	0	100	100	100	90-100	30-40	6-15

See footnote at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
Or*. Orthents-Water complex.											
Os*. Orthents, steep											
Pt*. Pits											
Ro------------------ Roellen	0-13	Silty clay------	CL, CH	A-6, A-7	0	100	100	95-100	90-100	45-65	20-40
	13-54	Clay, silty clay	CH	A-7	0	100	100	95-100	90-100	55-80	30-50
	54-62	Silty clay, silty clay loam, silt loam	CH, CL, ML, CL-ML	A-7, A-6, A-4	0	100	95-100	80-100	60-95	15-80	6-50
Sc------------------ Sharkey	0-9	Silty clay loam	CL	A-6, A-7-6	0	100	100	100	95-100	32-50	11-25
	9-77	Clay------------	CH	A-7-6	0	100	100	100	95-100	56-85	30-50
Sh------------------ Sharkey	0-5	Clay------------	CH, CL	A-7-6	0	100	100	100	95-100	46-85	22-50
	5-77	Clay------------	CH	A-7-6	0	100	100	100	95-100	56-85	30-50
Sm*:											
Sharkey-----------	0-9	Silty clay loam	CL	A-6, A-7-6	0	100	100	100	95-100	32-50	11-25
	9-77	Clay------------	CH	A-7-6	0	100	100	100	95-100	56-85	30-50
Steele------------	0-9	Loam, sandy loam	SM-SC, CL-ML, CL, SC	A-4, A-6	0	100	100	65-95	35-75	15-30	5-15
	9-25	Loamy sand------	SM	A-2	0	100	100	50-75	15-30	---	NP
	25-31	Fine sandy loam.	ML	A-4, A-6, A-7	0	100	100	85-95	65-75	30-45	5-15
	31-85	Silty clay, clay.	CH, CL	A-7	0	100	100	95-100	85-95	45-80	30-50
So------------------ Sikeston	0-5	Loam------------	SM-SC, CL-ML, CL, SC	A-4, A-6	0	100	100	65-95	35-75	15-30	5-15
	5-49	Loam, sandy clay loam, clay loam.	CL	A-6, A-7	0	100	100	80-100	50-85	35-45	20-30
	49-60	Stratified sandy clay loam to sand.	CL, SM, SC, SM-SC	A-4, A-6, A-2-4, A-2-6	0	100	100	50-90	15-55	<30	NP-15
Wd------------------ Wardell	0-8	Loam------------	SC, CL	A-6	0	100	100	75-100	45-85	25-35	10-20
	8-53	Clay loam, sandy clay loam, loam.	CL	A-6, A-7	0	100	100	80-100	50-85	35-45	20-30
	53-70	Stratified loamy sand to sand.	SM	A-2	0	100	100	50-75	15-30	<15	NP-3

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factor--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	In/hr	In/in	pH	Mmhos/cm				
Ag-----------------	0-7	0.2-0.6	0.21-0.23	4.5-5.5	<2	High-------	0.43	5	---
Alligator	7-49	<0.06	0.09-0.11	4.5-5.5	<2	Very high	0.24		
	49-78	<0.06	0.08-0.10	6.1-7.3	<2	Very high	0.24		
Ak*:									
Alligator--------	0-7	0.2-0.6	0.21-0.23	4.5-5.5	<2	High-------	0.43	5	---
	7-49	<0.06	0.09-0.11	4.5-5.5	<2	Very high	0.24		
	49-78	<0.06	0.08-0.10	6.1-7.3	<2	Very high	0.24		
Steele-----------	0-9	0.6-6.0	0.13-0.18	6.1-7.3	<2	Low--------	0.17	5	3
	9-25	6.0-20	0.10-0.12	6.1-7.3	<2	Low--------	0.17		
	25-31	0.6-2.0	0.13-0.16	6.1-7.3	<2	Low--------	0.28		
	31-85	0.06-0.2	0.15-0.20	6.1-7.3	<2	High-------	0.28		
Ba-----------------	0-12	0.06-0.2	0.18-0.22	4.5-6.5	<2	Moderate	0.37	5	---
Baldwin	12-24	<0.06	0.17-0.20	5.6-6.5	<2	Very high	0.32		
	24-63	<0.2	0.17-0.21	6.0-8.4	<2	High-------	0.32		
BeA, BeB----------	0-7	2.0-6.0	0.10-0.15	4.5-6.0	<2	Low--------	0.20	5	3
Beulah	7-35	2.0-6.0	0.10-0.20	4.5-6.0	<2	Low--------	0.20		
	35-60	>6.0	0.02-0.15	5.1-7.3	<2	Low--------	0.17		
Bk-----------------	0-18	2.0-6.0	0.10-0.15	5.1-6.5	<2	Low--------	0.24	4	3
Bosket	18-50	0.6-2.0	0.10-0.20	5.1-6.5	<2	Low--------	0.32		
	50-62	>2.0	0.02-0.15	5.1-6.5	<2	Low--------	0.24		
BrB----------------	0-32	6.0-20	0.09-0.12	5.6-6.5	<2	Low--------	0.17	5	2
Broseley	32-56	2.0-6.0	0.12-0.16	5.1-6.0	<2	Low--------	0.24		
	56-66	2.0-20	0.08-0.14	6.1-6.5	<2	Low--------	0.17		
Ca-----------------	0-35	<0.06	0.09-0.13	6.1-7.8	<2	High-------	0.28	4	4
Cairo	35-60	6.0-20	0.08-0.18	6.1-7.8	<2	Low--------	0.17		
Ch-----------------	0-13	0.2-0.6	0.21-0.23	4.5-6.0	<2	Low--------	0.49	3	---
Calhoun	13-51	0.06-0.2	0.20-0.22	4.5-5.5	<2	Moderate	0.43		
	51-66	0.2-0.6	0.21-0.23	4.5-7.8	<2	Low--------	0.43		
Cn-----------------	0-24	2.0-6.0	0.10-0.12	4.5-6.5	<2	Low--------	0.17	5	2
Canalou	24-39	2.0-6.0	0.12-0.14	5.6-7.3	<2	Low--------	0.17		
	39-70	2.0-6.0	0.05-0.10	5.6-7.3	<2	Low--------	0.17		
Co-----------------	0-6	0.6-2.0	0.16-0.24	4.5-5.5	<2	Low--------	0.43	5	---
Collins	6-64	0.6-2.0	0.20-0.24	4.5-5.5	<2	Low--------	0.43		
Ct-----------------	0-12	0.06-0.2	0.12-0.21	6.1-7.8	<2	High-------	0.37	5	4
Cooter	12-60	>6.0	0.06-0.11	6.1-7.8	<2	Low--------	0.17		
Cw-----------------	0-19	0.2-0.6	0.22-0.24	4.5-8.4	<2	Low--------	0.43	4	---
Crowley	19-51	<0.06	0.11-0.13	4.5-6.5	<2	High-------	0.32		
	51-69	0.06-0.2	0.10-0.20	5.6-8.4	<2	Moderate	0.32		
Db-----------------	0-14	0.6-2.0	0.20-0.22	4.5-6.0	<2	Low--------	0.37	5	---
Dubbs	14-47	0.6-2.0	0.18-0.22	4.5-6.0	<2	Moderate	0.37		
	47-60	2.0-6.0	0.05-0.10	4.5-6.0	<2	Low--------	0.37		
De*:									
Dubbs------------	0-14	0.6-2.0	0.20-0.22	4.5-6.0	<2	Low--------	0.37	5	---
	14-47	0.6-2.0	0.18-0.22	4.5-6.0	<2	Moderate	0.37		
	47-60	2.0-6.0	0.05-0.10	4.5-6.0	<2	Low--------	0.37		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	In/hr	In/in	pH	Mmhos/cm				
De*:									
Silverdale------	0-8	6.0-20	0.10-0.15	5.6-7.3	<2	Low--------	0.15	5	2
	8-31	6.0-20	0.04-0.07	5.6-7.3	<2	Low--------	0.15		
	31-63	0.6-2.0	0.18-0.22	5.6-7.3	<2	Low--------	0.43		
	63-70	6.0-20	0.04-0.07	6.1-7.3	<2	Low--------	0.15		
Dn--------------- Dundee	0-13	0.6-2.0	0.15-0.20	4.5-6.0	<2	Low--------	0.37	4	---
	13-48	0.2-0.6	0.15-0.20	4.5-6.0	<2	Moderate	0.32		
	48-66	0.6-2.0	0.15-0.20	4.5-7.3	<2	Low--------	0.32		
Ds*:									
Dundee----------	0-13	0.6-2.0	0.15-0.20	4.5-6.0	<2	Low--------	0.37	4	2
	13-48	0.2-0.6	0.15-0.20	4.5-6.0	<2	Moderate	0.32		
	48-66	0.6-2.0	0.15-0.20	4.5-7.3	<2	Low--------	0.32		
Silverdale------	0-8	6.0-20	0.10-0.15	5.6-7.3	<2	Low--------	0.15	5	2
	8-31	6.0-20	0.04-0.07	5.6-7.3	<2	Low--------	0.15		
	31-63	0.6-2.0	0.18-0.22	5.6-7.3	<2	Low--------	0.43		
	63-70	6.0-20	0.04-0.07	6.1-7.3	<2	Low--------	0.15		
Fa--------------- Falaya	0-62	0.6-2.0	0.20-0.22	4.5-5.5	<2	Low--------	0.43	5	---
Fg--------------- Farrenburg	0-17	0.6-2.0	0.16-0.22	4.5-6.0	<2	Low--------	0.37	5	3
	17-52	0.6-2.0	0.15-0.19	4.5-6.0	<2	Moderate	0.37		
	52-68	>6.0	0.05-0.10	5.6-7.3	<2	Low--------	0.37		
Fo--------------- Foley	0-11	0.6-2.0	0.13-0.24	4.5-7.3	<2	Low--------	0.43	3	---
	11-18	0.2-0.6	0.18-0.24	5.1-7.3	<2	Moderate	0.43		
	18-69	<0.06	0.10-0.14	5.1-9.0	<2	Moderate	0.43		
	69-71	<0.06	0.10-0.14	6.6-9.0	<2	Low--------	0.49		
Ft--------------- Fountain	0-12	0.2-0.6	0.20-0.23	5.6-7.8	<2	Low--------	0.37	3	---
	12-35	0.2-0.6	0.20-0.22	6.6-7.8	<2	Moderate	0.37		
	35-62	0.2-0.6	0.21-0.23	6.6-8.4	<2	Low--------	0.37		
Gd--------------- Gideon	0-8	0.2-0.6	0.17-0.22	6.1-7.8	<2	Low--------	0.32	5	6
	8-30	0.2-0.6	0.15-0.19	6.1-7.8	<2	Moderate	0.32		
	30-48	0.2-0.6	0.14-0.16	6.1-7.8	<2	Moderate	0.32		
	48-73	0.6-20	0.08-0.15	6.1-7.8	<2	Low--------	0.32		
Jp--------------- Jackport	0-9	0.2-0.6	0.21-0.23	4.5-6.0	<2	Moderate	0.43	5	---
	9-26	<0.06	0.11-0.13	4.5-5.5	<2	High-------	0.32		
	26-55	<0.06	0.08-0.11	4.5-5.5	<2	High-------	0.32		
	55-65	<0.06	0.18-0.20	4.5-7.8	<2	High-------	0.32		
	65-73	<0.2	0.20-0.22	6.1-7.8	<2	High-------	0.43		
Lf--------------- Lafe	0-6	0.6-2.0	0.13-0.24	5.1-6.5	<2	Low--------	0.49	1	---
	6-43	<0.06	0.09-0.15	7.4-9.0	<2	Moderate	0.49		
	43-70	<0.2	0.02-0.07	7.9-9.0	<2	Moderate	0.49		
Ln--------------- Lilbourn	0-15	2.0-6.0	0.13-0.18	5.6-7.3	<2	Low--------	0.24	5	3
	15-26	2.0-6.0	0.10-0.18	5.6-7.3	<2	Low--------	0.24		
	26-38	0.6-2.0	0.17-0.22	4.5-5.5	<2	Moderate	0.24		
	38-67	2.0-20	0.07-0.16	5.1-6.5	<2	Low--------	0.24		
LoB, LoC--------- Loring	0-11	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low--------	0.43	3	---
	11-22	0.6-2.0	0.20-0.22	4.5-6.0	<2	Low--------	0.43		
	22-34	0.2-0.6	0.06-0.13	4.5-6.0	<2	Low--------	0.43		
	34-67	0.6-2.0	0.06-0.13	4.5-6.5	<2	Low--------	0.43		
LoD2------------- Loring	0-5	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low--------	0.43	3	---
	5-12	0.6-2.0	0.20-0.22	4.5-6.0	<2	Low--------	0.43		
	12-20	0.2-0.6	0.06-0.13	4.5-6.0	<2	Low--------	0.43		
	20-60	0.6-2.0	0.06-0.13	4.5-6.5	<2	Low--------	0.43		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	In/hr	In/in	pH	Mmhos/cm				
Ma---------------- Malden	0-4	6.0-20	0.02-0.06	5.1-6.5	<2	Very low	0.17	5	1
	4-50	6.0-20	0.04-0.10	5.1-6.5	<2	Very low	0.17		
	50-69	6.0-20	0.02-0.06	5.1-6.5	<2	Very low	0.17		
MeC, MeD---------- Memphis	0-13	0.6-2.0	0.22-0.24	4.5-6.0	<2	Low--------	0.37	5	---
	13-62	0.6-2.0	0.20-0.22	4.5-6.0	<2	Low--------	0.37		
	62-77	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low--------	0.37		
MeE2-------------- Memphis	0-4	0.6-2.0	0.22-0.24	4.5-6.0	<2	Low--------	0.37	5	---
	4-40	0.6-2.0	0.20-0.22	4.5-6.0	<2	Low--------	0.37		
	40-60	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low--------	0.37		
Or*. Orthents-Water complex									
Os*. Orthents, steep									
Pt*. Pits									
Ro---------------- Roellen	0-13	0.06-0.2	0.12-0.14	5.6-7.8	<2	High-------	0.32	5	---
	13-54	0.06-0.2	0.08-0.13	5.6-7.8	<2	High-------	0.37		
	54-62	0.06-2.0	0.14-0.20	5.6-7.8	<2	High-------	0.37		
Sc---------------- Sharkey	0-9	0.2-0.6	0.21-0.23	5.1-8.4	<2	Moderate	0.37	5	---
	9-77	<0.06	0.09-0.11	5.6-8.4	<2	Very high	0.28		
Sh---------------- Sharkey	0-5	<0.06	0.11-0.13	5.1-8.4	<2	Very high	0.24	5	---
	5-77	<0.06	0.09-0.11	5.6-8.4	<2	Very high	0.28		
Sm*:									
Sharkey----------	0-9	0.2-0.6	0.20-0.22	5.1-8.4	<2	Moderate	0.37	5	---
	9-77	<0.06	0.18-0.20	5.6-8.4	<2	Very high	0.28		
Steele-----------	0-9	0.6-6.0	0.13-0.18	6.1-7.3	<2	Low--------	0.17	5	3
	9-25	6.0-20	0.10-0.12	6.1-7.3	<2	Low--------	0.17		
	25-31	0.6-2.0	0.13-0.16	6.1-7.3	<2	Low--------	0.28		
	31-85	0.06-0.2	0.15-0.20	6.1-7.3	<2	High-------	0.28		
So---------------- Sikeston	0-5	0.6-2.0	0.14-0.21	6.1-7.8	<2	Low--------	0.24	5	5
	5-49	0.2-0.6	0.15-0.18	6.1-7.8	<2	Moderate	0.24		
	49-60	0.6-20	0.05-0.15	6.1-7.8	<2	Low--------	0.24		
Wd---------------- Wardell	0-8	0.2-0.6	0.18-0.22	5.6-7.3	<2	Low--------	0.37	5	6
	8-53	0.06-0.2	0.15-0.19	4.5-6.5	<2	Moderate	0.37		
	53-70	>6.0	0.05-0.08	5.1-6.5	<2	Low--------	0.37		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

[Absence of an entry indicates the feature is not a concern. The definitions of "flooding" and "water table" in the Glossary explain such terms as "rare," "brief," and "perched." The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
Ag: Alligator	D	Rare to common.	Brief to long.	Jan-Apr	0.5-2.0	Apparent	Jan-Apr	>60	---	---	High	Moderate.
Ak*:												
Alligator	D	Rare to common.	Brief to long.	Jan-Apr	0.5-2.0	Apparent	Jan-Apr	>60	---	---	High	Moderate.
Steele	C	Rare	---	---	1.5-3.0	Perched	Jan-May	>60	---	---	High	Low.
Ba: Baldwin	D	None to rare	Brief to long.	Dec-Jun	0-2.0	Apparent	Dec-Mar	>60	---	---	High	Moderate.
BeA, BeB: Beulah	B	None to rare	Brief to long.	Dec-Apr	>6.0	---	---	>60	---	---	Low	Moderate.
Bk: Bosket	B	None to rare	---	Dec-May	>6.0	---	---	>60	---	---	Low	Moderate.
BrB: Broseley	B	None	---	---	>6.0	---	---	>60	---	---	Low	Moderate.
Ca: Cairo	D	Common	Brief	Nov-Jun	0-2.0	Apparent	Nov-Jun	>60	---	---	High	Moderate.
Ch: Calhoun	D	None	---	---	0-2.0	Perched	Dec-Apr	>60	---	---	High	Moderate.
Cn: Canalou	B	None to rare	---	---	2.0-3.0	Apparent	Jan-May	>60	---	---	Low	Moderate.
Co: Collins	C	Rare to common.	Brief to very long	Jan-Apr	2.0-5.0	Apparent	Jan-Apr	>60	---	---	Moderate	Moderate.
Ct: Cooter	B	Common	Very brief	Feb-May	2.0-3.0	Apparent	Nov-Apr	>60	---	---	High	Low.
Cw: Crowley	D	None to rare	---	---	0.5-1.5	Perched	Dec-Apr	>60	---	---	High	Moderate.
Db: Dubbs	B	None	---	---	>6.0	---	---	>60	---	---	Moderate	Moderate.
De*:												
Dubbs	B	None	---	---	>6.0	---	---	>60	---	---	Moderate	Moderate.
Silverdale	A	Rare	---	---	2.0-3.0	Perched	Jan-May	>60	---	---	Moderate	Moderate.
Dn: Dundee	C	None	---	---	1.5-3.5	Apparent	Jan-Apr	>60	---	---	High	Moderate.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
Ds*:												
Dundee	C	None	---	---	1.5-3.5	Apparent	Jan-Apr	>60	---	---	High	Moderate.
Silverdale	A	Rare	---	---	2.0-3.0	Perched	Jan-May	>60	---	---	Moderate	Moderate.
Fa Falaya	D	Common	Brief to long.	Dec-Apr	1.0-2.0	Apparent	Dec-Apr	>60	---	---	High	Moderate.
Fg Farrenburg	B	None to rare	---	---	2.0-3.0	Perched	Nov-Apr	>60	---	---	Moderate	Moderate.
Fo Foley	D	None to occasional.	Brief to long.	Dec-May	0-1.0	Perched	Dec-Apr	>60	---	---	High	Low.
Ft Fountain	D	None to occasional.	---	---	0.0-1.5	Apparent	Dec-Apr	>60	---	---	High	Low.
Gd Gideon	B/D	Occasional	Brief	Feb-May	0-1.0	Apparent	Nov-Apr	>60	---	---	High	Low.
Jp Jackport	D	None to rare	---	Dec-Apr	0-1.0	Perched	Dec-Apr	>60	---	---	High	High.
Lf Lafe	D	None	---	---	0-1.0	Perched	Dec-Apr	>60	---	---	High	Moderate.
Ln Lilbourn	B	Rare	---	---	0-2.0	Perched	Nov-Apr	>60	---	---	Moderate	High.
LoB, LoC, LoD2 Loring	C	None	---	---	2.0-3.0	Perched	Dec-Mar	>60	---	---	Moderate	Moderate.
Ma Malden	A	None	---	---	>6.0	---	---	>60	---	---	Low	Moderate.
MeC, MeD, MeE2 Memphis	B	None	---	---	>6.0	---	---	>60	---	---	Moderate	Moderate.
Or*. Orthents-Water complex												
Os*. Orthents, steep												
Pt*. Pits												
Ro Roellen	D	Occasional	Brief	Jan-May	0-1.0	Apparent	Jan-May	>60	---	---	High	Low.
Sc, Sh Sharkey	D	None to common.	Brief to very long.	Dec-Jun	0-2.0	Apparent	Dec-Apr	>60	---	---	High	Low.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
Sm*:												
Sharkey----------	D	None to common.	Brief to very long.	Dec-Jun	0-2.0	Apparent	Dec-Apr	>60	---	---	High-----	Low.
Steele-----------	C	Rare---------	---	---	1.5-3.0	Perched	Jan-May	>60	---	---	High-----	Low.
So--------------- Sikeston	B/D	Rare to frequent.	Long------	Mar-Jun	0-1.5	Perched	Jan-May	>60	---	---	High-----	Low.
Wd--------------- Wardell	C	Rare---------	---	---	0-1.5	Perched	Nov-Apr	>60	---	---	High-----	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series]

Soil name	Family or higher taxonomic class
Alligator	Very-fine, montmorillonitic, acid, thermic Vertic Haplaquepts
Baldwin	Fine, montmorillonitic, thermic Vertic Ochraqualfs
Beulah	Coarse-loamy, mixed, thermic Typic Dystrochrepts
Bosket	Fine-loamy, mixed, thermic Mollic Hapludalfs
Broseley	Loamy, mixed, thermic Arenic Hapludalfs
Cairo	Clayey over sandy or sandy-skeletal, montmorillonitic, thermic Vertic Haplaquolls
Calhoun	Fine-silty, mixed, thermic Typic Glossaqualfs
Canalou	Coarse-loamy, mixed, thermic Aquic Dystric Eutrochrepts
Collins	Coarse-silty, mixed, acid, thermic Aquic Udifluvents
Cooter	Clayey over sandy or sandy-skeletal, montmorillonitic, thermic Fluvaquentic Hapludolls
Crowley	Fine, montmorillonitic, thermic Typic Albaqualfs
Dubbs	Fine-silty, mixed, thermic Typic Hapludalfs
Dundee	Fine-silty, mixed, thermic Aeric Ochraqualfs
Falaya	Coarse-silty, mixed, acid, thermic Aeric Fluvaquents
*Farrenburg	Fine-loamy, mixed, thermic Glossaquic Hapludalfs
Foley	Fine-silty, mixed, thermic Albic Glossic Natraqualfs
Fountain	Fine-silty, mixed, thermic Typic Glossaqualfs
Gideon	Fine-loamy, mixed, nonacid, thermic Mollic Fluvaquents
Jackport	Very-fine, montmorillonitic, thermic Vertic Ochraqualfs
Lafe	Fine-silty, mixed, thermic Glossic Natrudalfs
Lilbourn	Coarse-loamy, mixed, nonacid, thermic Aeric Fluvaquents
Loring	Fine-silty, mixed, thermic Typic Fragiudalfs
Malden	Mixed, thermic Typic Udipsamments
Memphis	Fine-silty, mixed, thermic Typic Hapludalfs
Orthents-Water	Non-acid, thermic Udorthents
Orthents, steep	Sandy, siliceous, acid, thermic Udorthents
Roellen	Fine, montmorillonitic, thermic Vertic Haplaquolls
Sharkey	Very-fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts
Sikeston	Fine-loamy, mixed, thermic Cumulic Haplaquolls
Silverdale	Sandy over loamy, mixed, non-acid, thermic Aquic Udifluvents
Steele	Sandy over clayey, mixed, nonacid, thermic Aquic Udifluvents
Wardell	Fine-loamy, mixed, thermic Mollic Ochraqualfs

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

MISSOURI AGRICULTURAL EXPERIMENT STATION

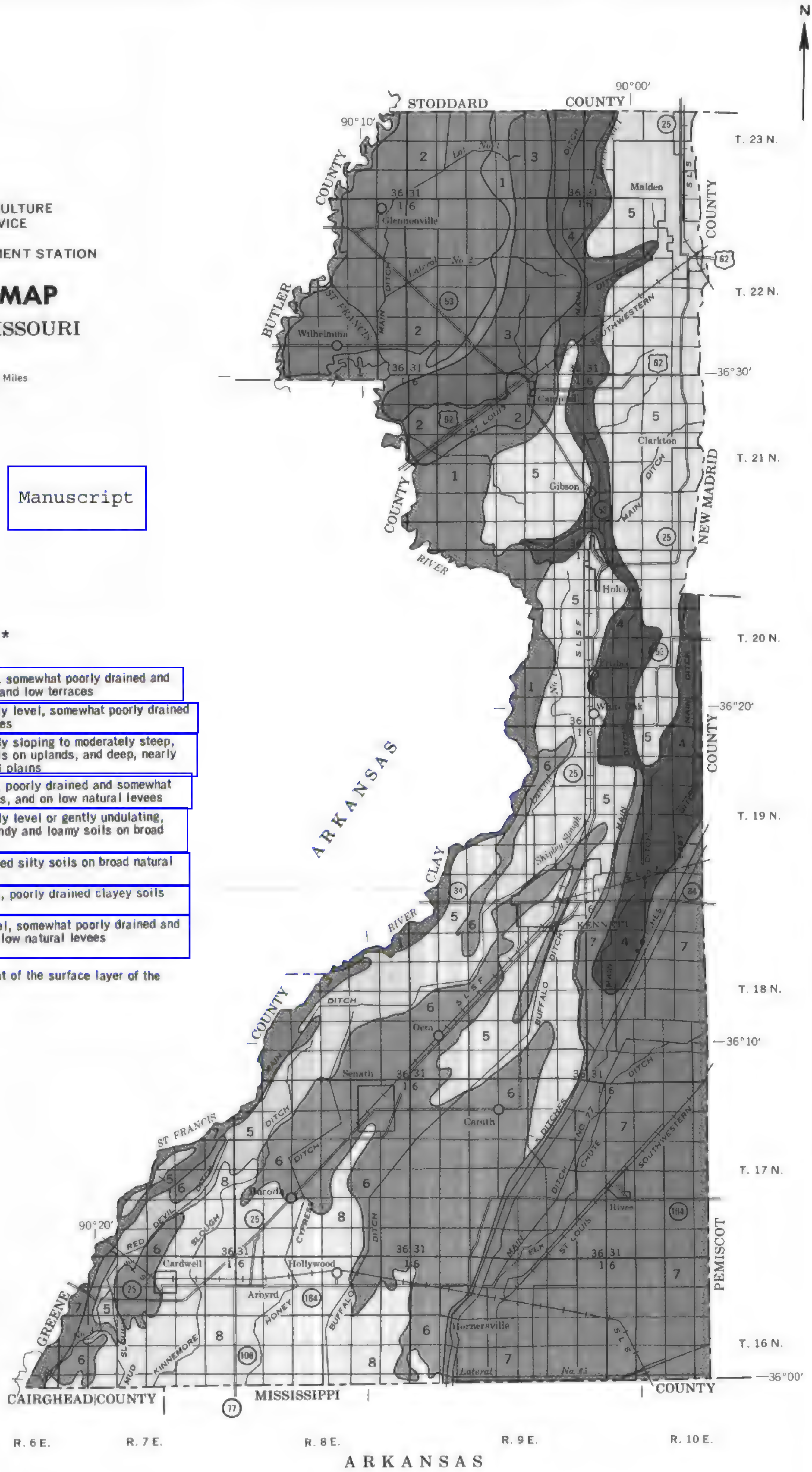
GENERAL SOIL MAP

DUNKLIN COUNTY, MISSOURI

Scale 1:253,440

1 0 1 2 3 4 Miles

Index Map   Welcome Page   Manuscript



SOIL LEGEND*

- 1 Falaya–Fountain association: Deep, nearly level, somewhat poorly drained and poorly drained silty soils on flood plains, levees, and low terraces
- 2 Crowley–Calhoun–Foley association: Deep, nearly level, somewhat poorly drained and poorly drained silty soils on terraces and levees
- 3 Loring–Memphis–Falaya association: Deep, gently sloping to moderately steep, moderately well drained and well drained silty soils on uplands, and deep, nearly level, somewhat poorly drained silty soils on flood plains
- 4 Gideon–Lilbourn association: Deep, nearly level, poorly drained and somewhat poorly drained loamy soils in drainageways, basins, and on low natural levees
- 5 Malden–Canalou–Bosket association: Deep, nearly level or gently undulating, moderately well drained to excessively drained sandy and loamy soils on broad natural levees
- 6 Dubbs association: Deep, nearly level, well drained silty soils on broad natural levees or terraces
- 7 Sharkey association: Deep, level and nearly level, poorly drained clayey soils in slack water positions
- 8 Dundee–Silverdale association: Deep, nearly level, somewhat poorly drained and moderately well drained sandy and loamy soils on low natural levees

* Texture given in the descriptive heading refers to that of the surface layer of the major soils in each association.

Compiled 1978

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

INDEX TO MAP SHEETS

DUNKLIN COUNTY, MISSOURI

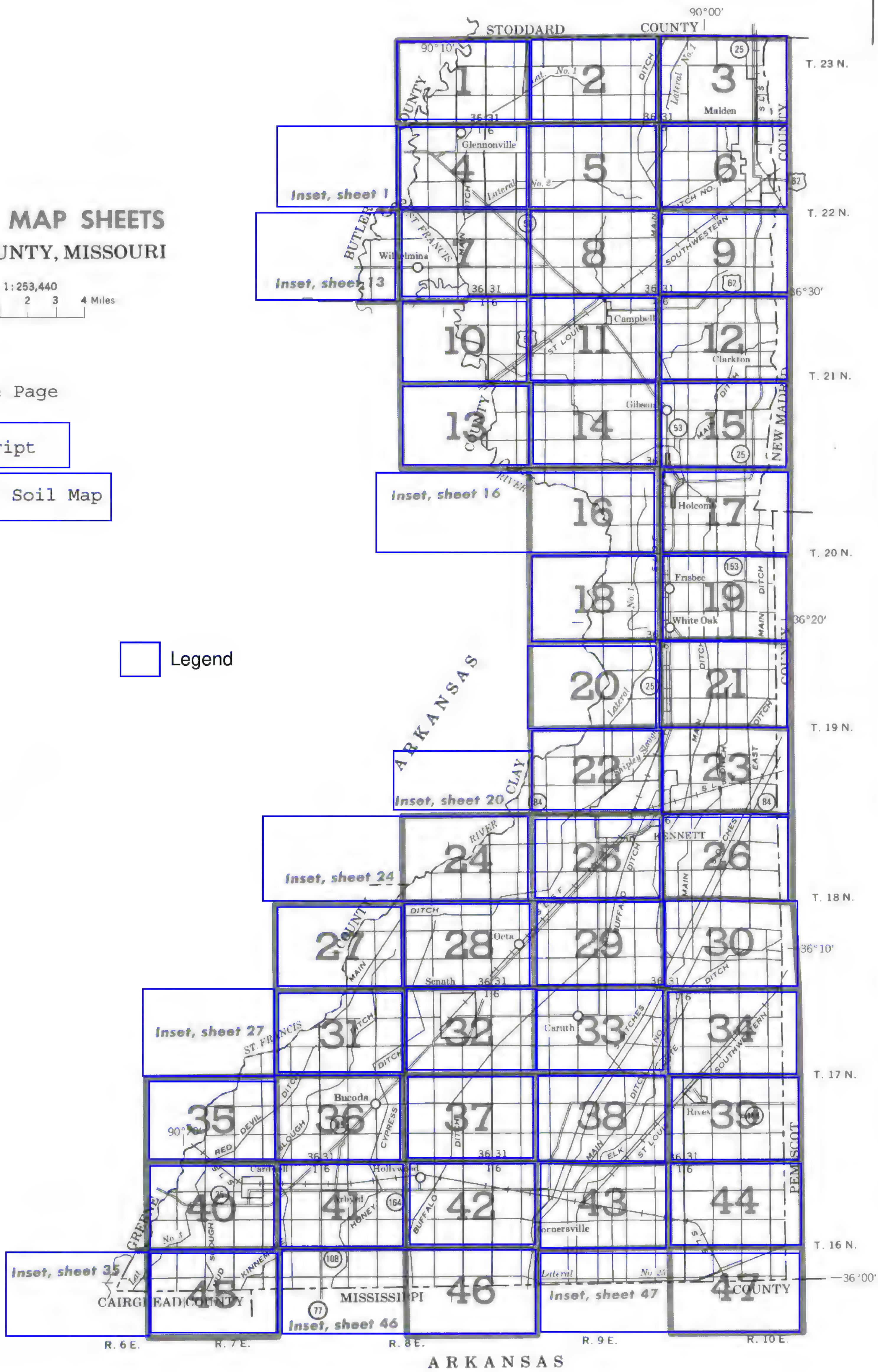
Scale 1:253,440

Welcome Page

Manuscript

General Soil Map

Legend



6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Welcome Page | Index Map | Manuscript

SOIL LEGEND

The first capital letter is the initial one of the soil name. The lower case letter that follows separates mapping units having names that begin with the same letter, except that it does not separate sloping or eroded phases. The second capital letter indicates the class of slope. Symbols without a slope letter are commonly for soils with a slope range of 0 to 2 percent, or they are for miscellaneous areas. A final number 2 in the symbol indicates that the soil is eroded.

SYMBOL	NAME
Ag	Alligator silty clay loam
Ak	Alligator–Steele complex
Ba	Baldwin silty clay loam
BeA	Beulah fine sandy loam, 0 to 2 percent slopes
BeB	Beulah fine sandy loam, 2 to 5 percent slopes
Bk	Bosket fine sandy loam
BrB	Broseley loamy fine sand, 2 to 5 percent slopes
Ca	Cairo silty clay
Ch	Calhoun silt loam
Cn	Canalou loamy fine sand
Co	Collins silt loam
Ct	Cooter silty clay
Cw	Crowley silt loam
Db	Dubbs silt loam
De	Dubbs–Silverdale complex
Dn	Dundee silt loam
Ds	Dundee–Silverdale loamy sands
Fa	Falaya silt loam
Fg	Farrenburg fine sandy loam
Fo	Foley silt loam
Ft	Fountain silt loam
Gd	Gideon loam
Jp	Jackport silty clay loam
Lf	Lafe silt loam
Ln	Lilbourn fine sandy loam
LoB	Loring silt loam, 2 to 5 percent slopes
LoC	Loring silt loam, 5 to 9 percent slopes
LoD2	Loring silt loam, 9 to 14 percent slopes, eroded
Ma	Malden fine sand, 0 to 4 percent slopes
MeC	Memphis silt loam, 5 to 9 percent slopes
MeD	Memphis silt loam, 9 to 14 percent slopes
MeE2	Memphis silt loam, 14 to 30 percent slopes, eroded
Or	Orthents–Water complex
Os	Orthents, steep
Pt	Pits, gravel
Ro	Roellen silty clay
Sc	Sharkey silty clay loam
Sh	Sharkey clay
Sm	Sharkey–Steele complex
So	Sikeston loam
Wd	Wardell loam

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool — Davis Airstrip; FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS

- Interstate — 79
- Federal — 410
- State — 52
- County, farm or ranch — 378

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small — water; w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — GAS
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water; w
- Intermittent — int; i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — CeA; FoB2

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown) — S

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Borrow area up to 10 acres in size
- Cotton gin

Index Map Welcome Page Manuscript

2

DUNKLIN COUNTY, MISSOURI — SHEET NUMBER 2

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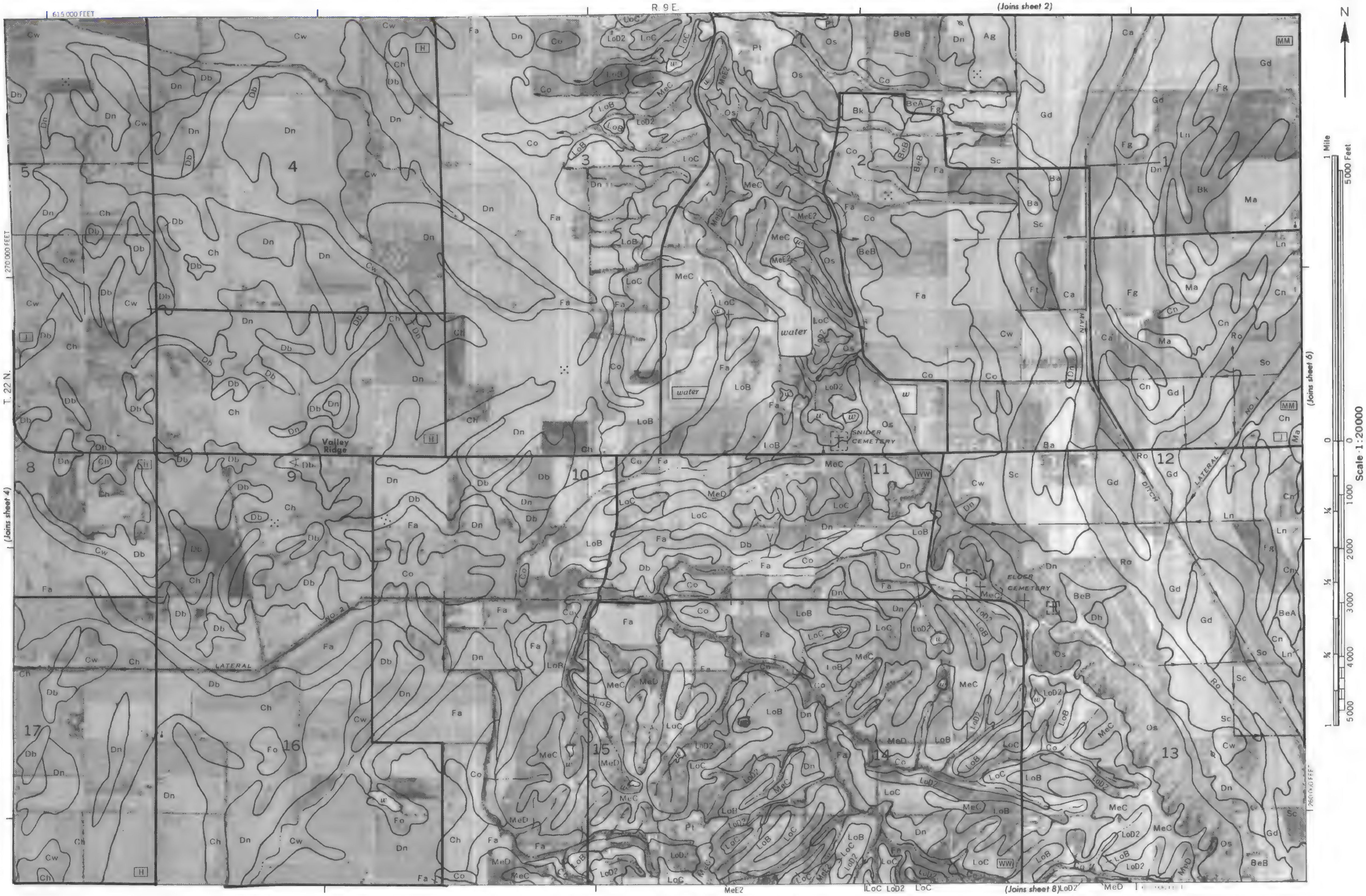
DUNKLIN COUNTY, MISSOURI — SHEET NUMBER 3

Index Map Welcome Page Manuscript

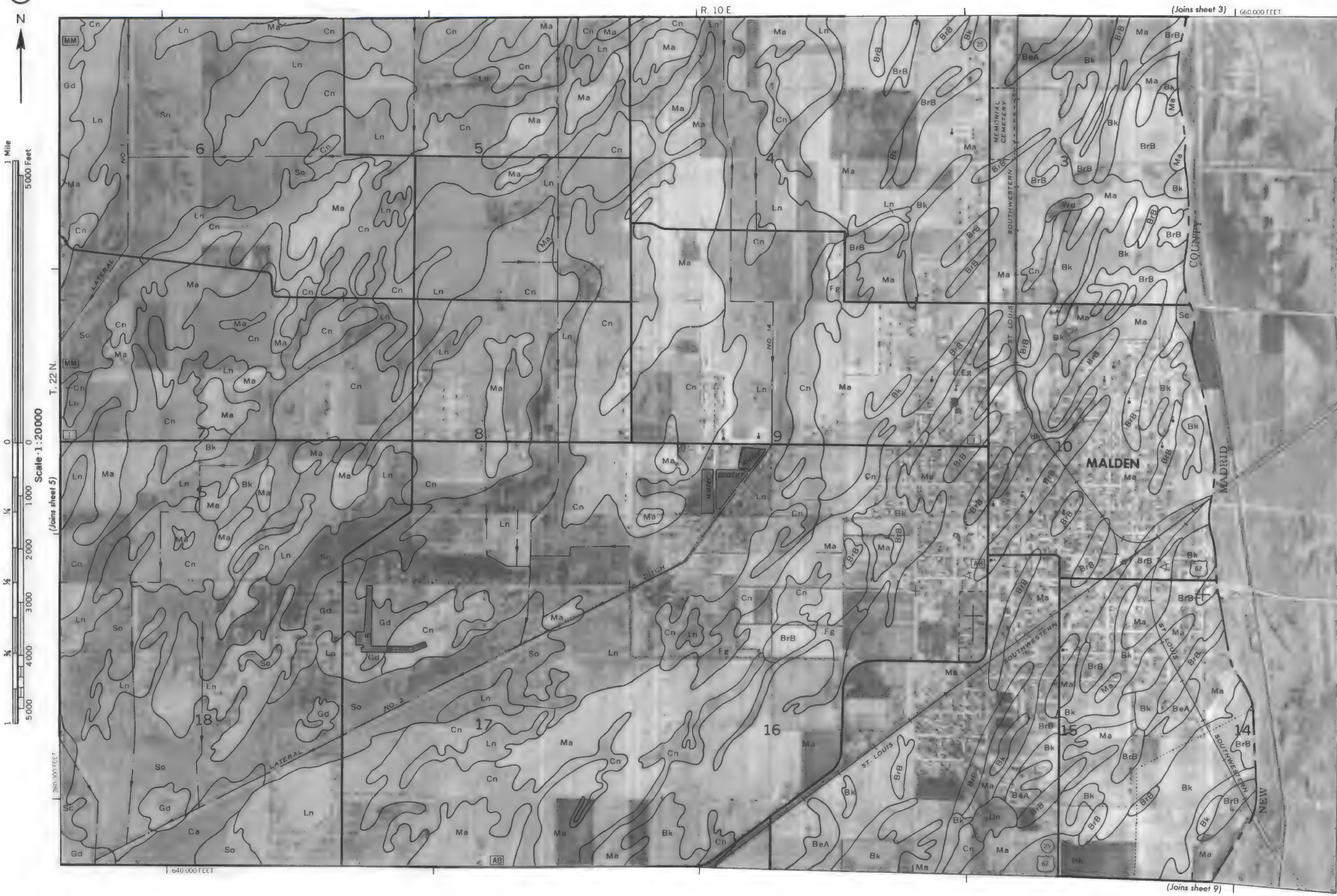
DUNKLIN COUNTY, MISSOURI — SHEET NUMBER 5

5



Index Map Welcome Page Manuscript

DUNKLIN COUNTY, MISSOURI — SHEET NUMBER 6



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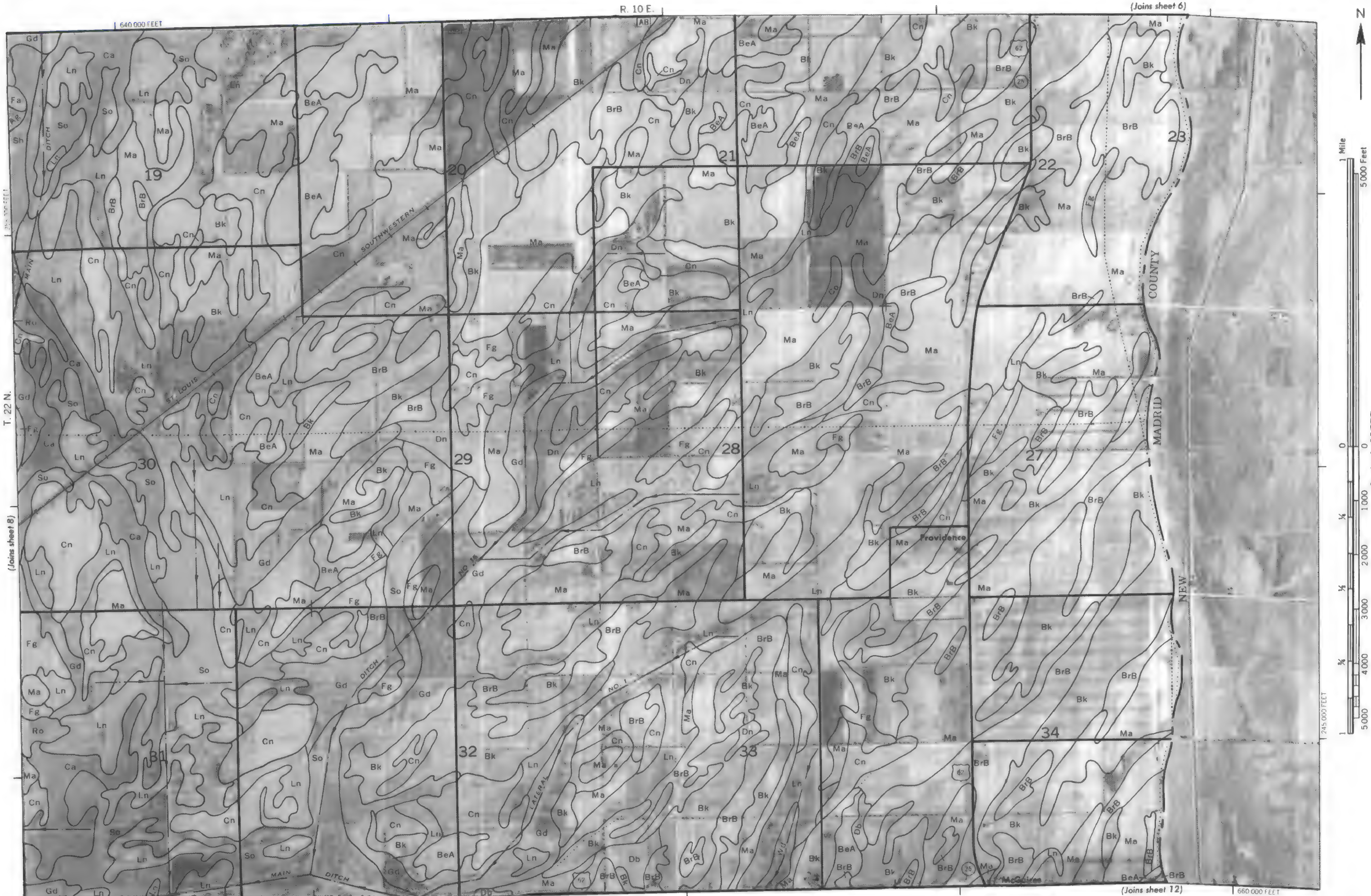

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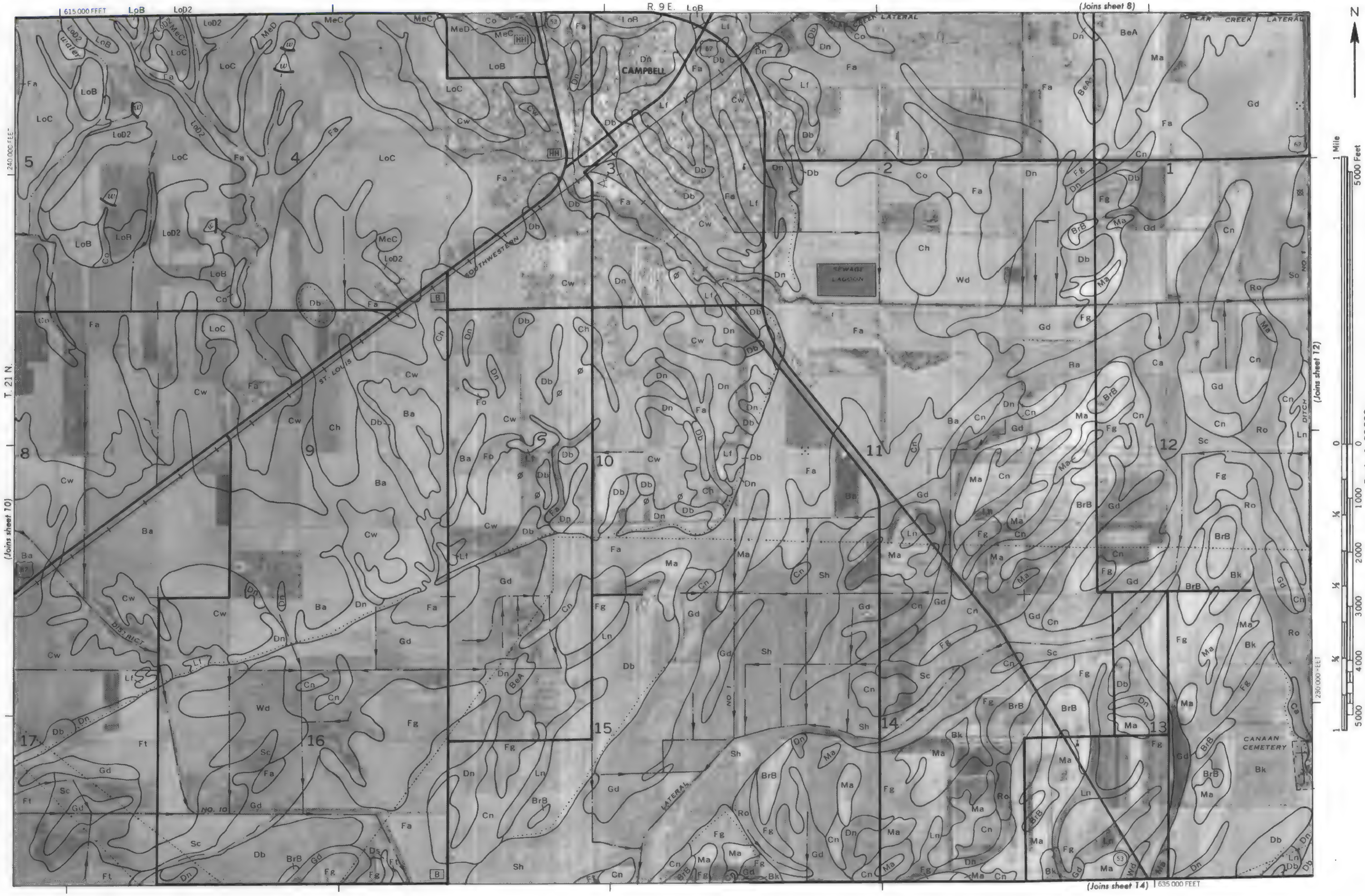

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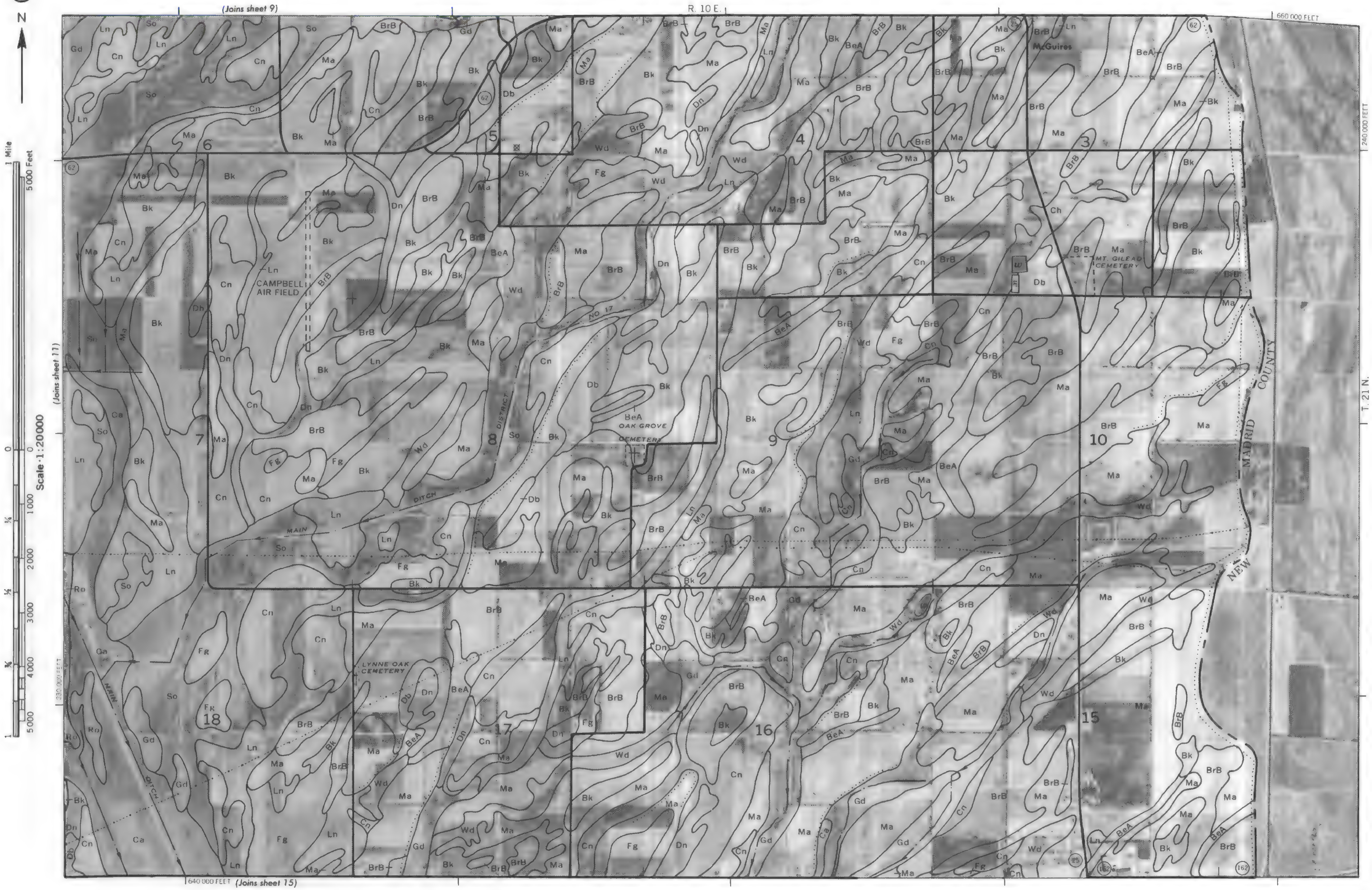

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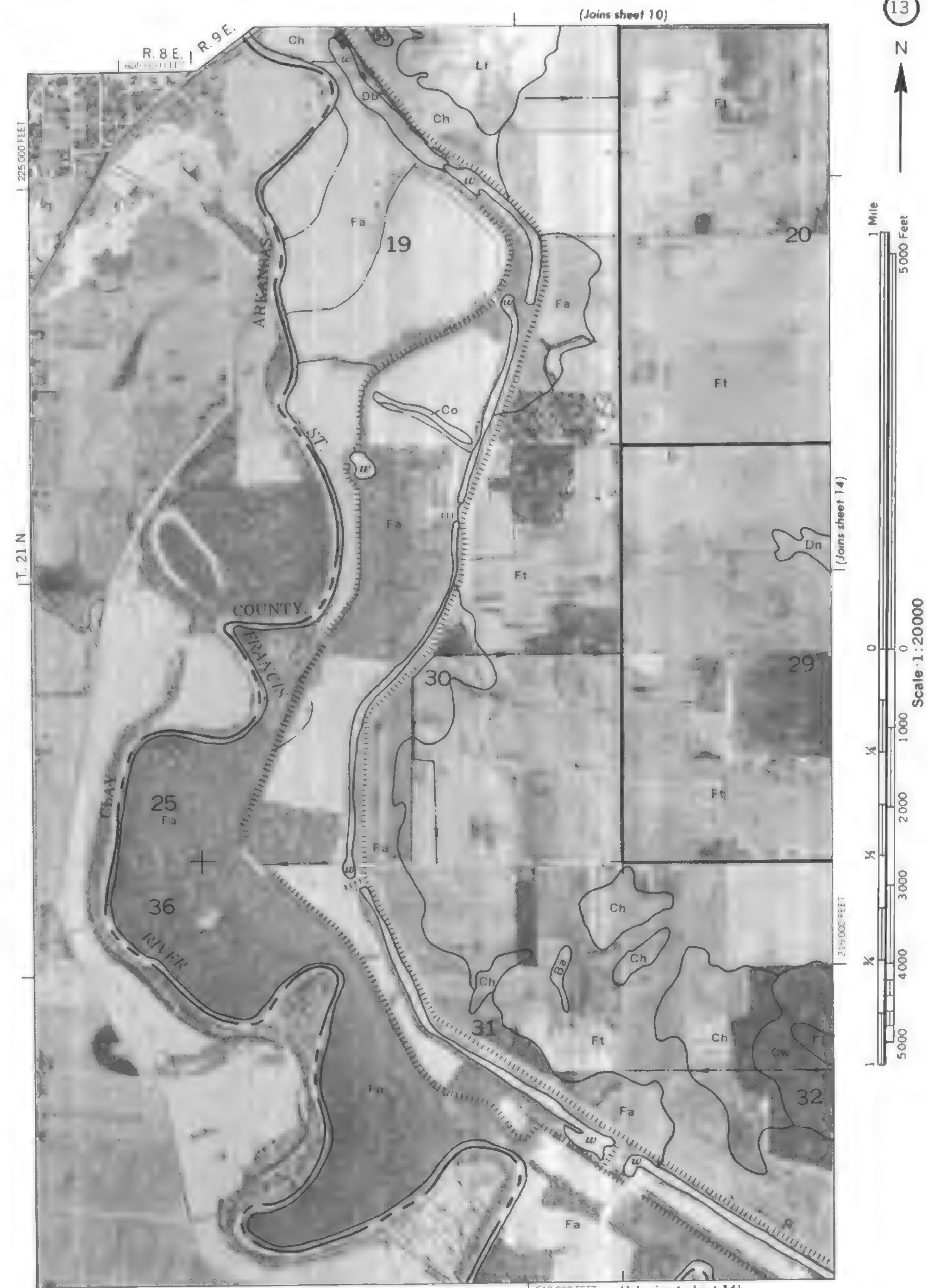

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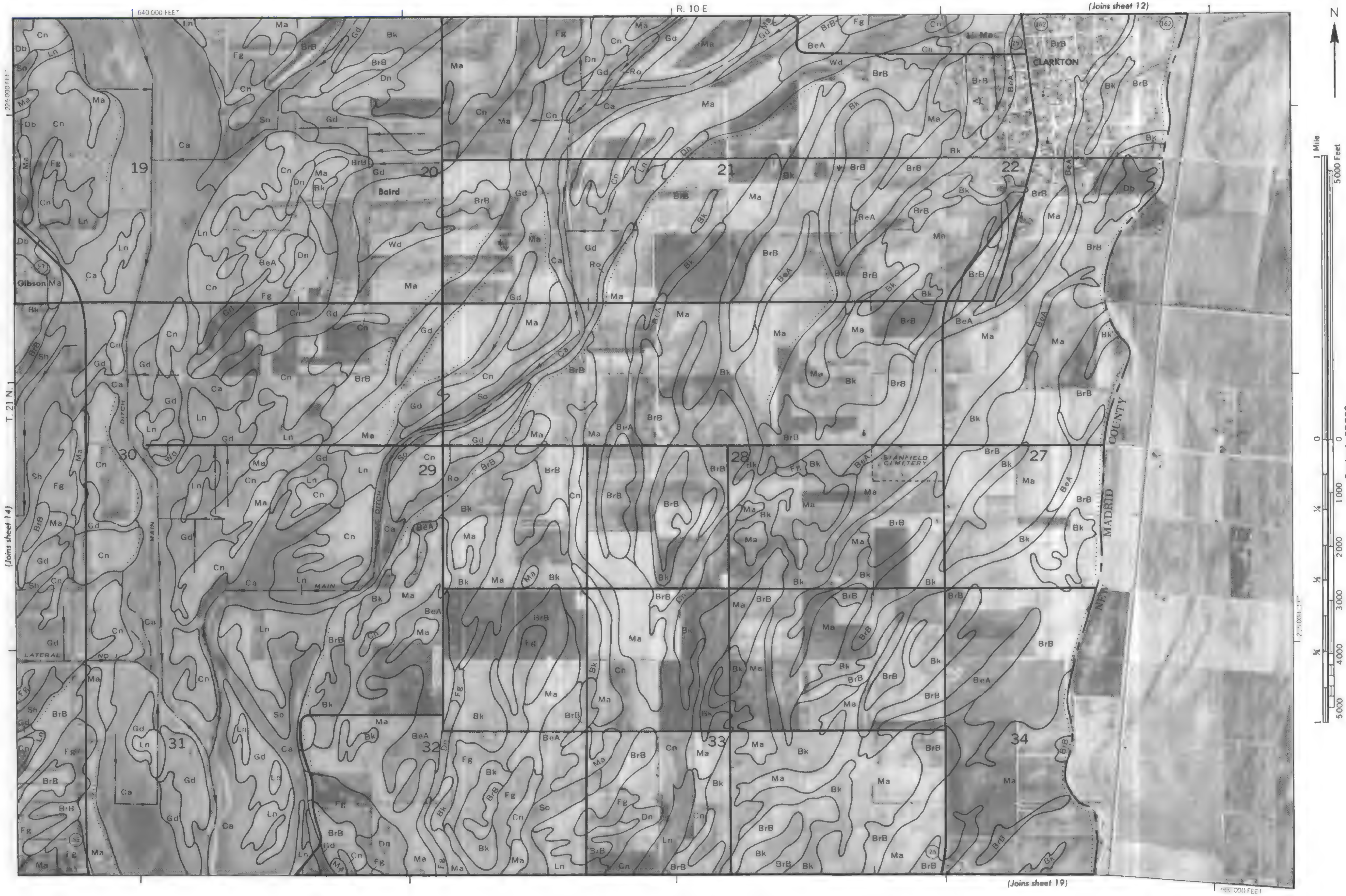

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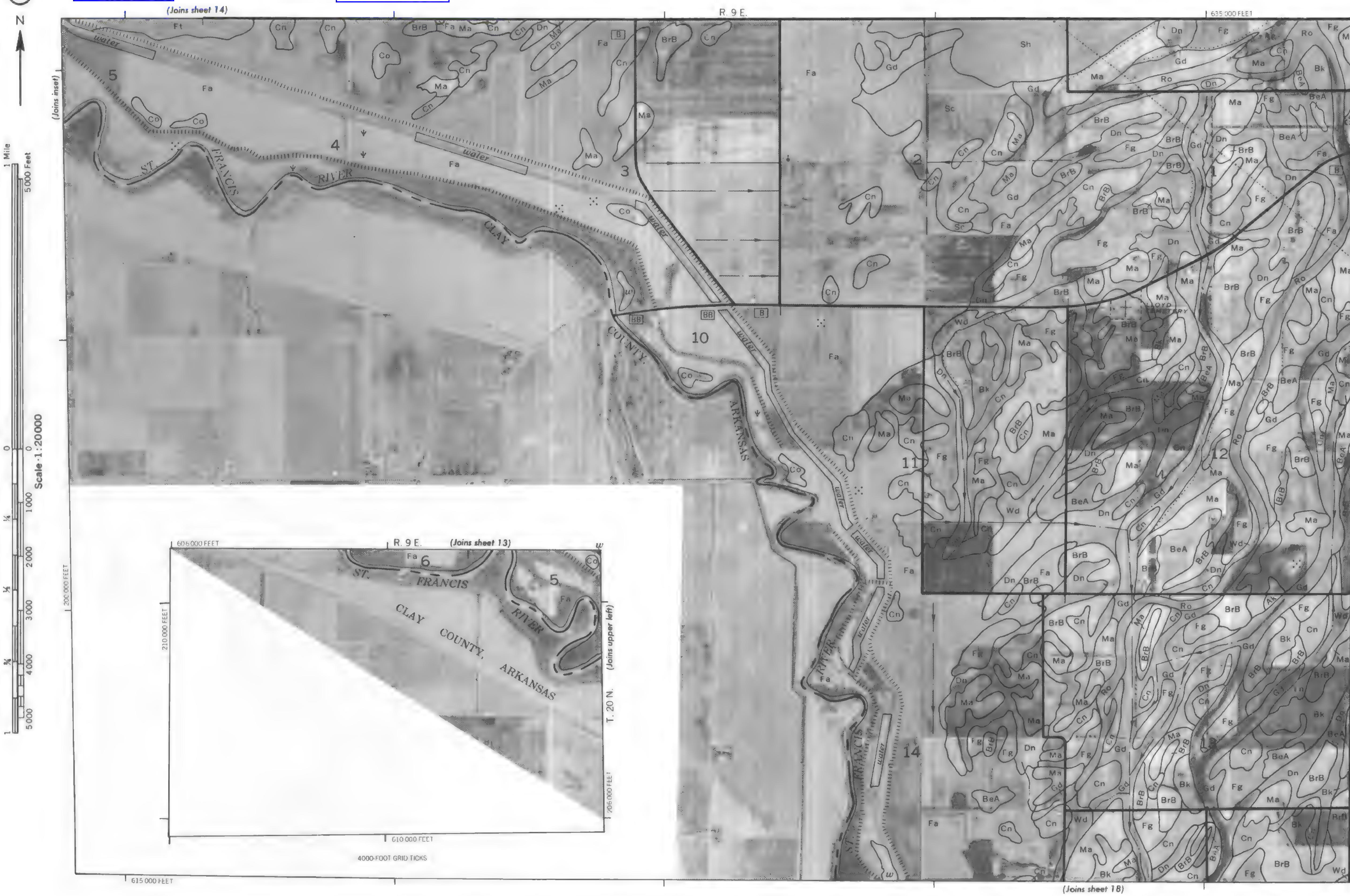

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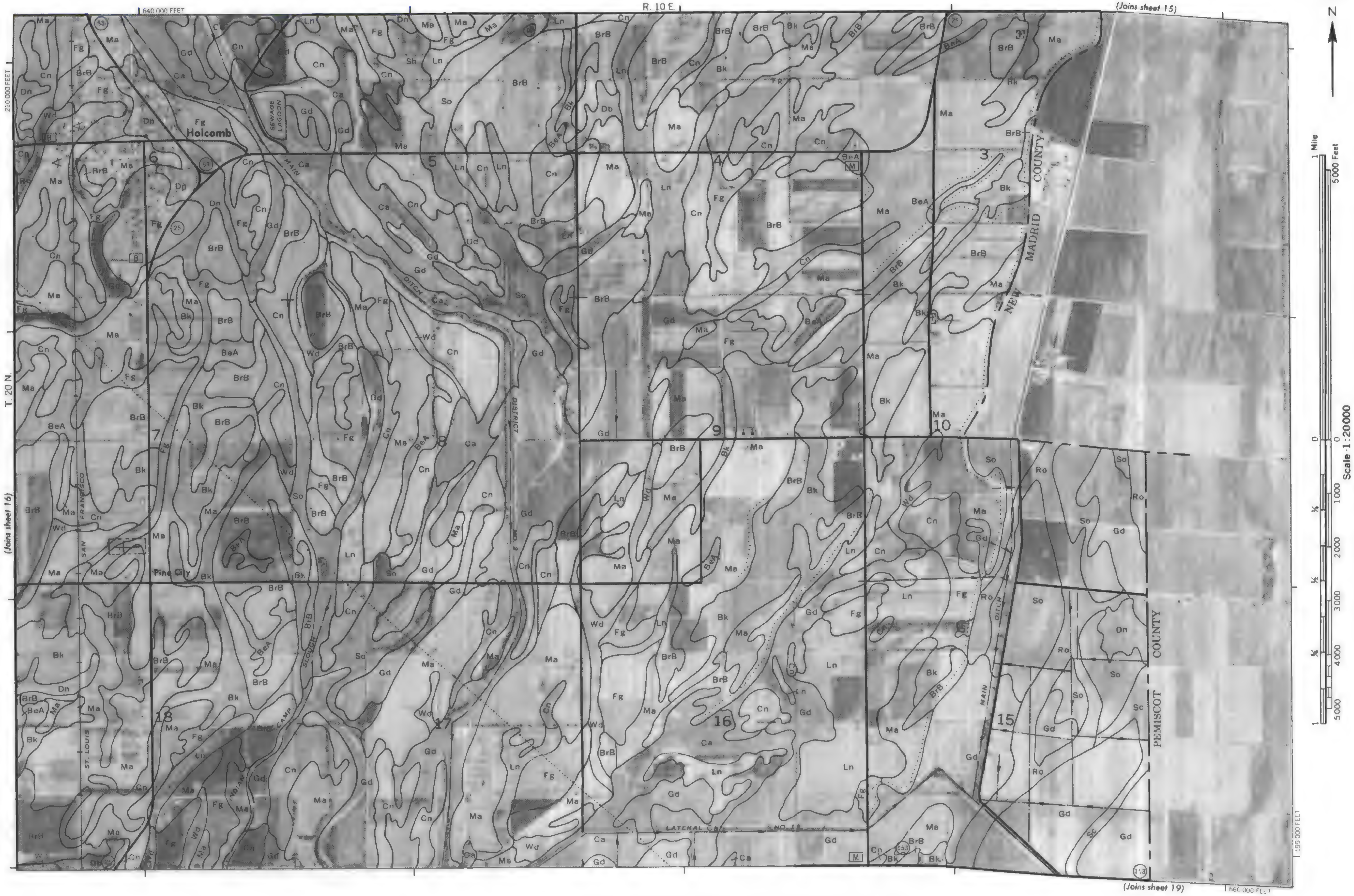

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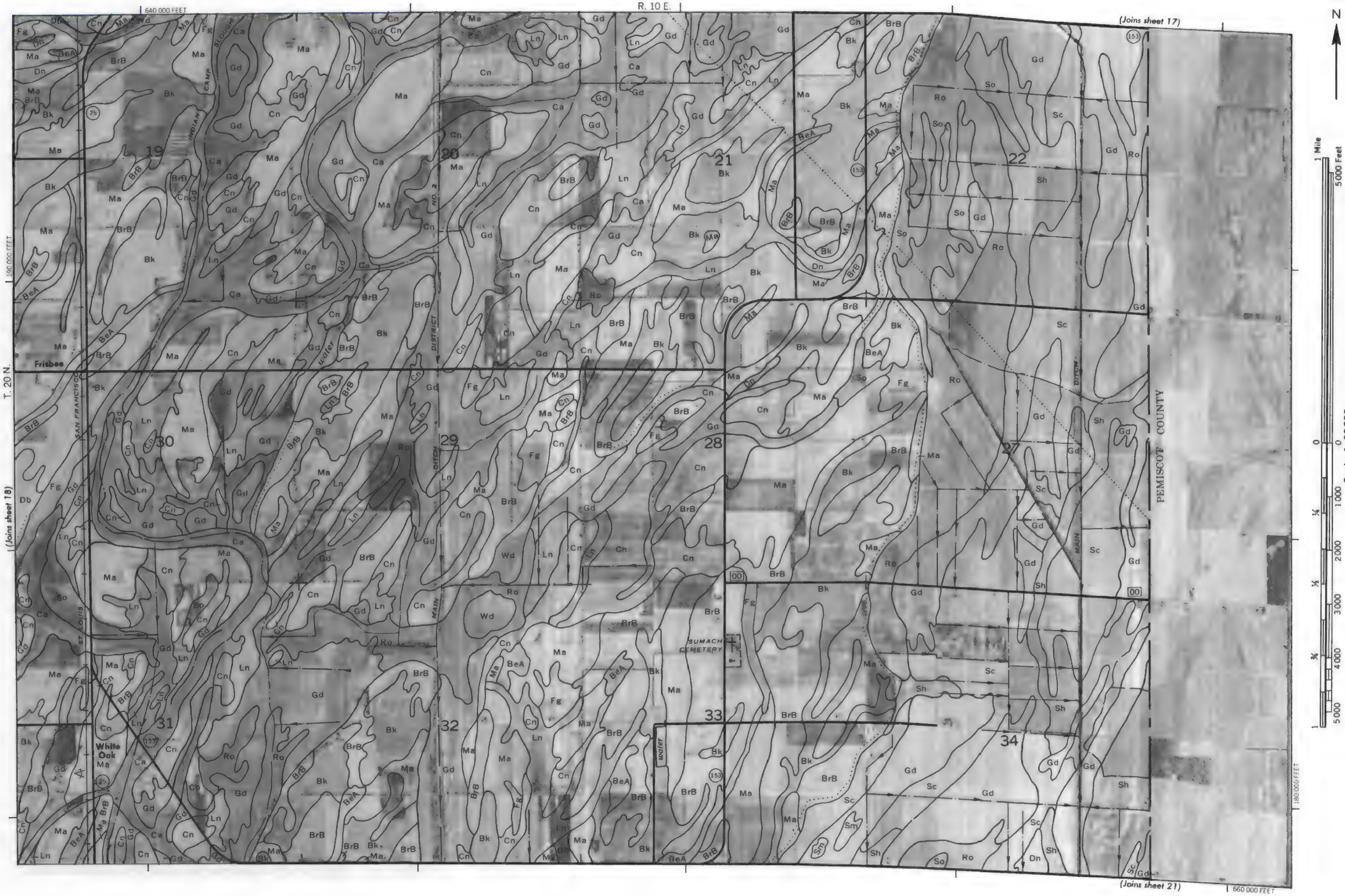
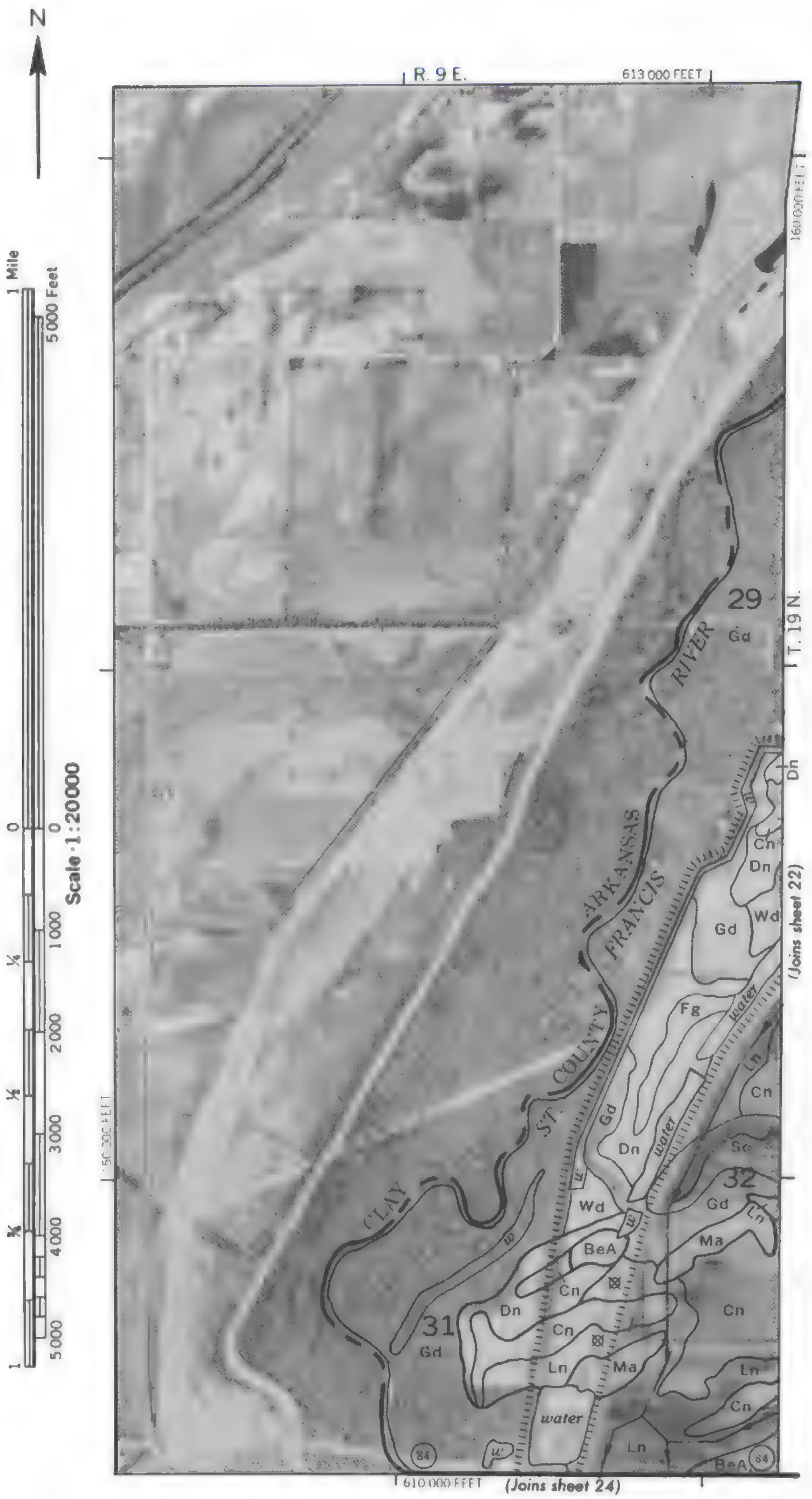
Index Map Welcome Page Manuscript

DUNKLIN COUNTY, MISSOURI — SHEET NUMBER 19





3000 AND 5000-FOOT GRID TICKS

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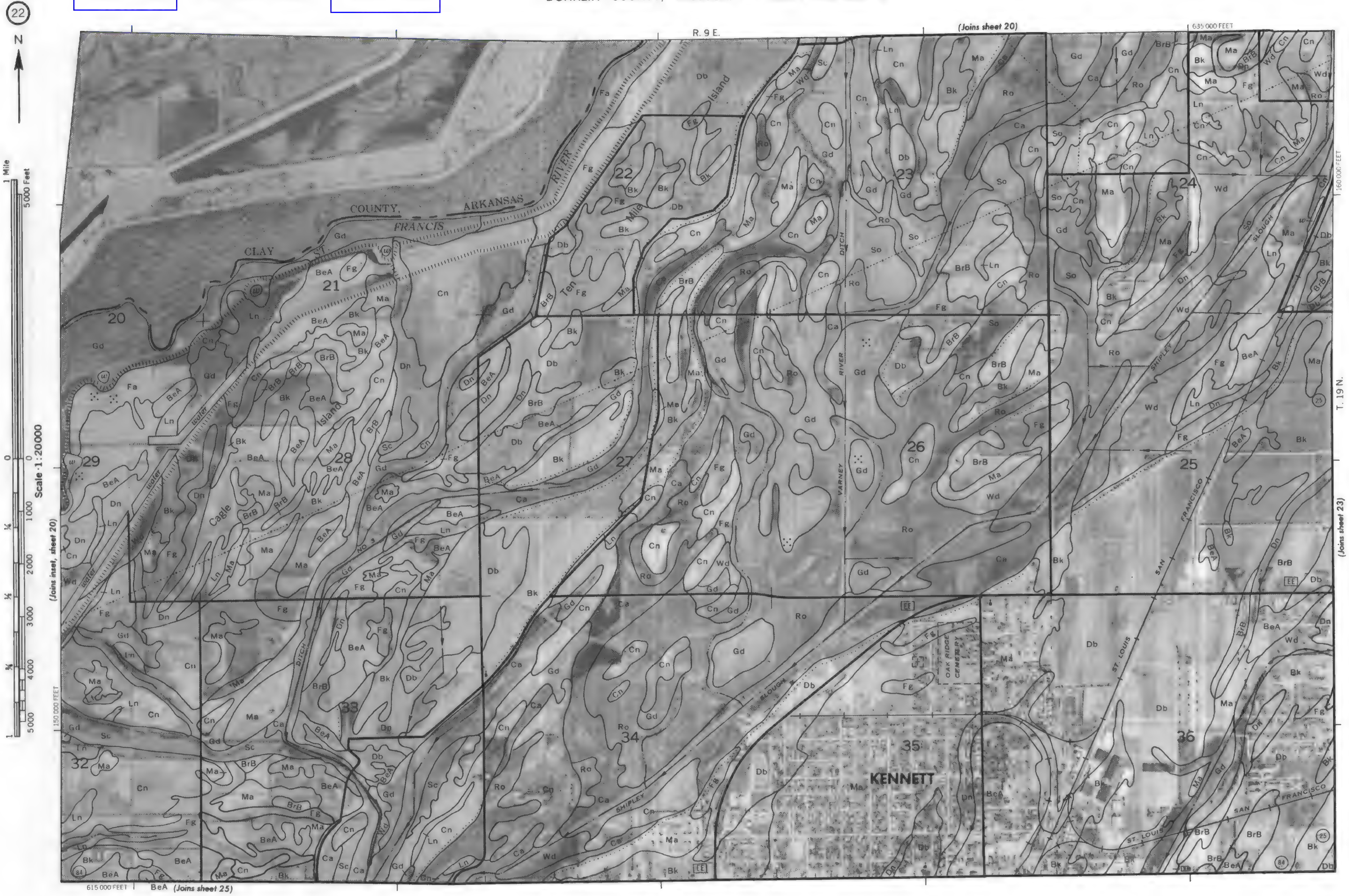
(Joins sheet 19)
(Joins sheet 20)
(Joins sheet 23)
R. 10 E.
T. 19 N.
PEMISCOT COUNTY
Church Camp
N
Scale 1:20000
1 Mile
5000 Feet
640 000 FEET
660 000 FEET

Index Map

Welcome Page

Manuscript

DUNKLIN COUNTY, MISSOURI — SHEET NUMBER 22



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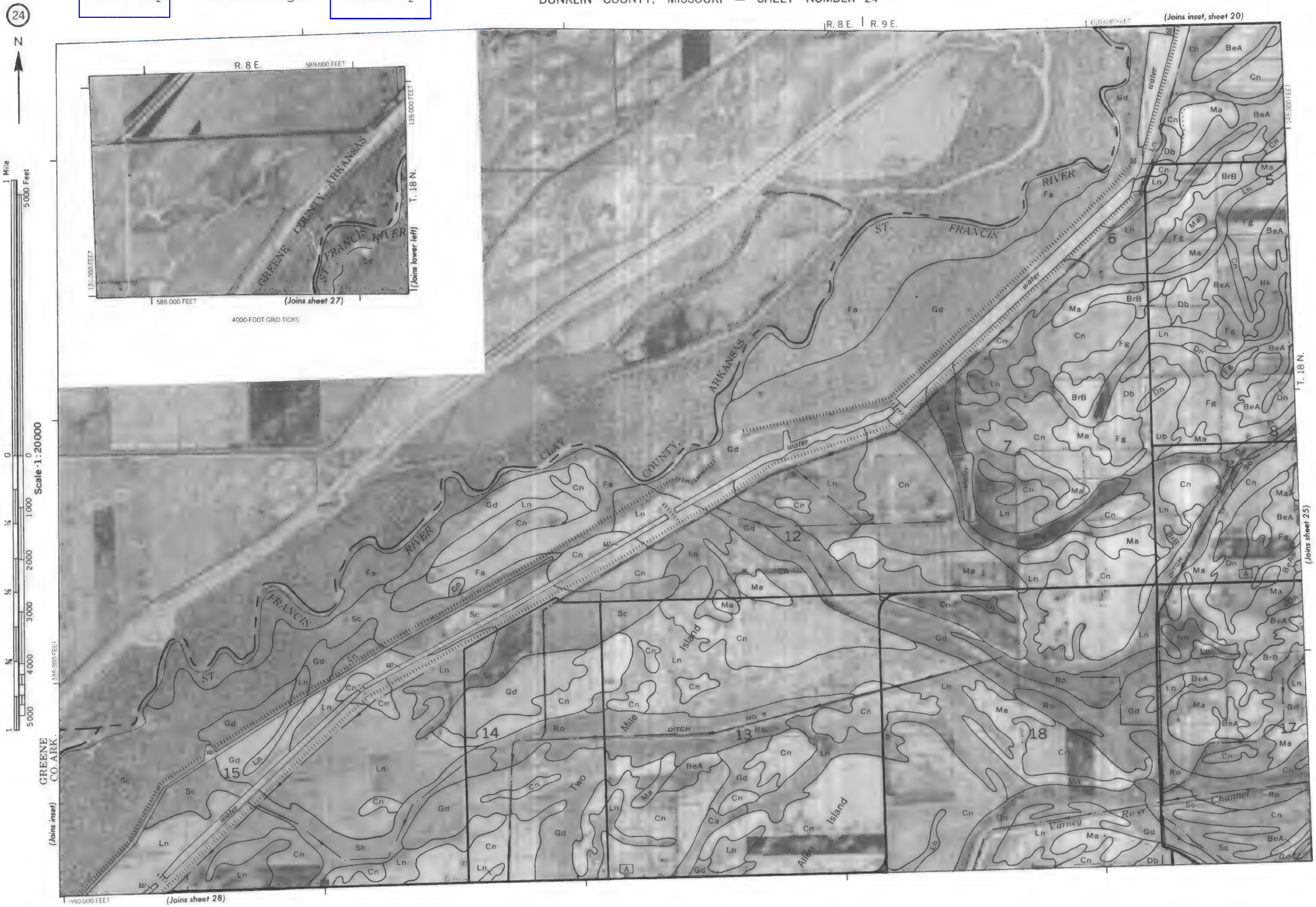

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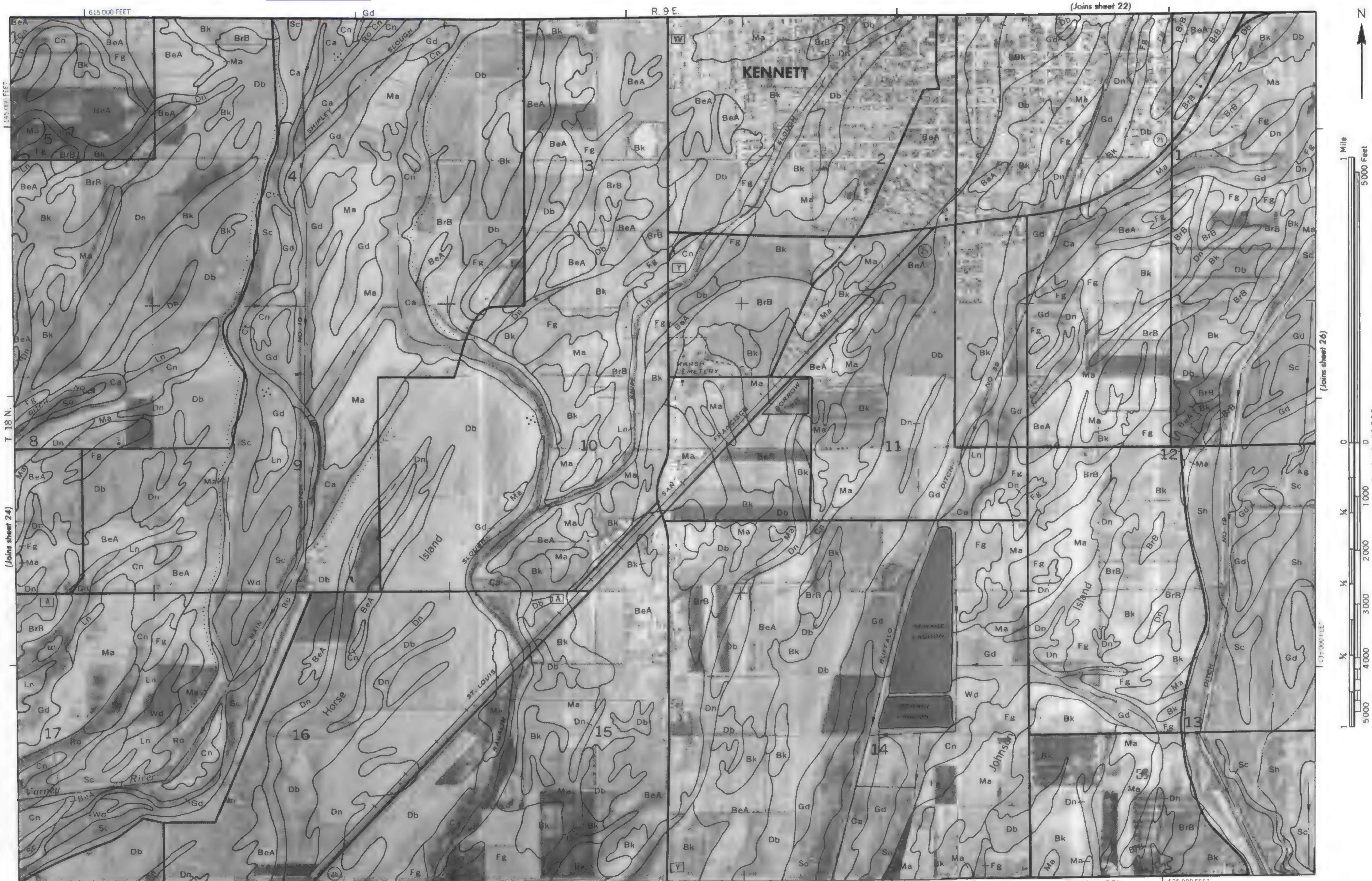

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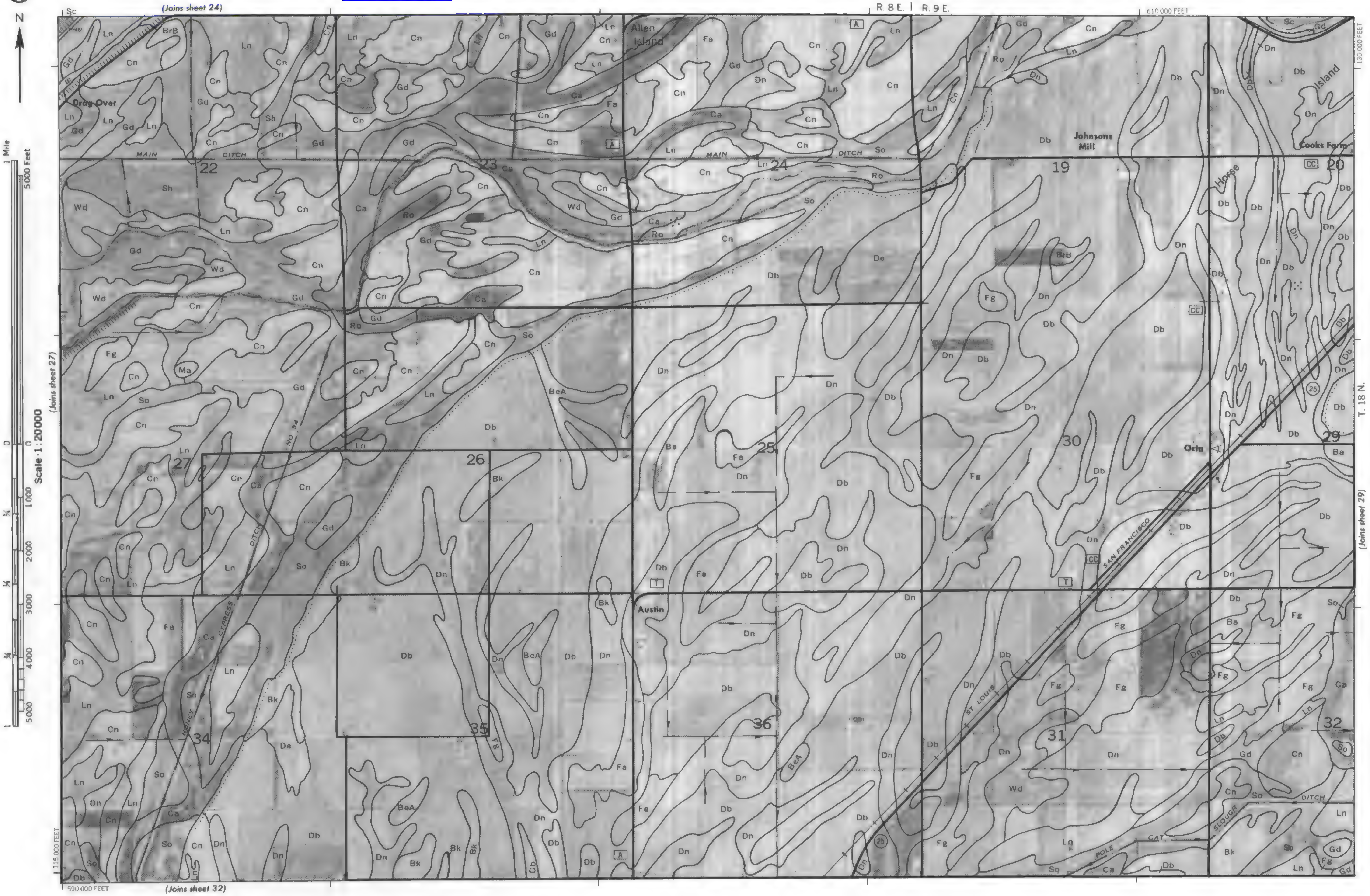

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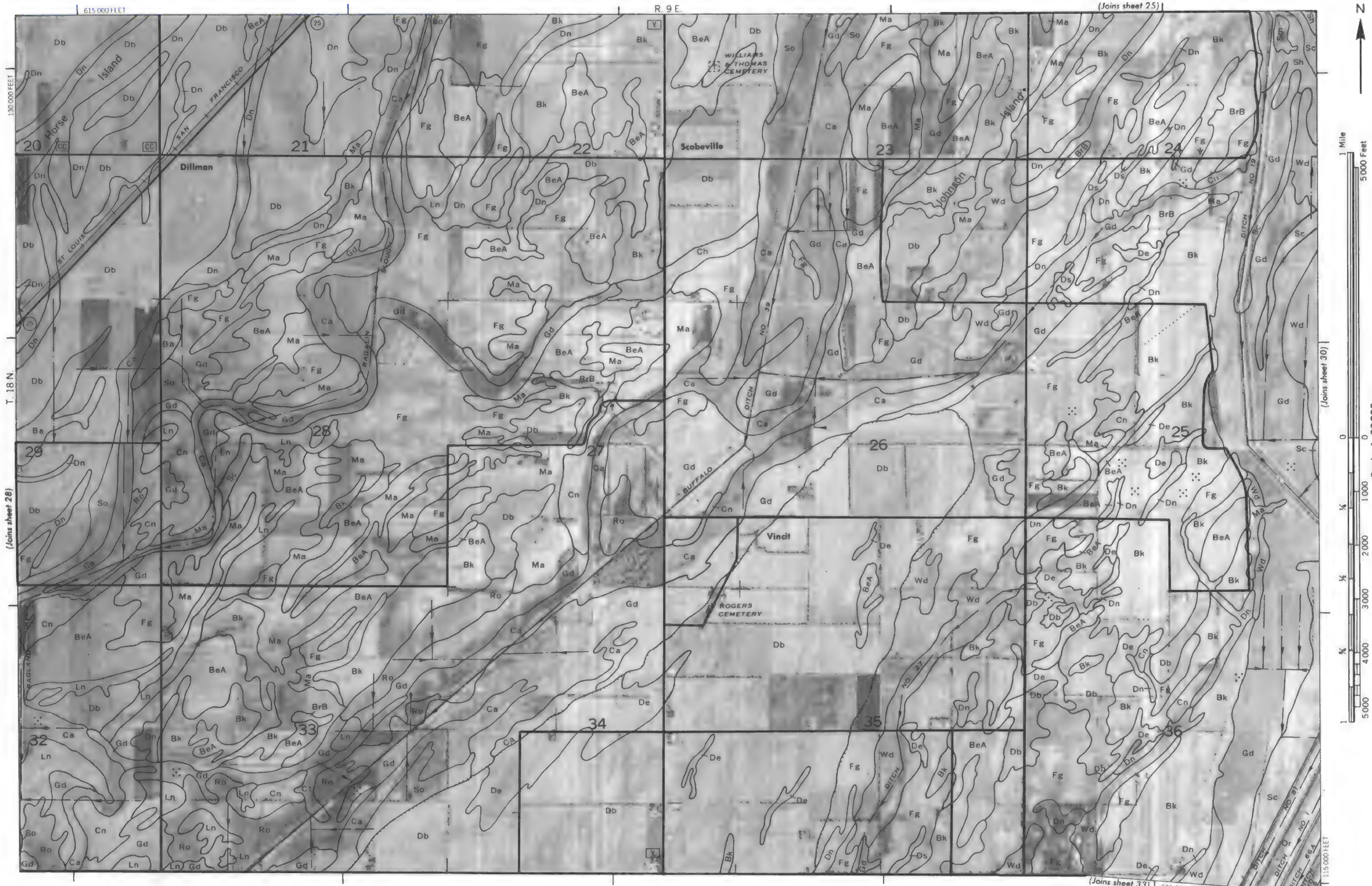

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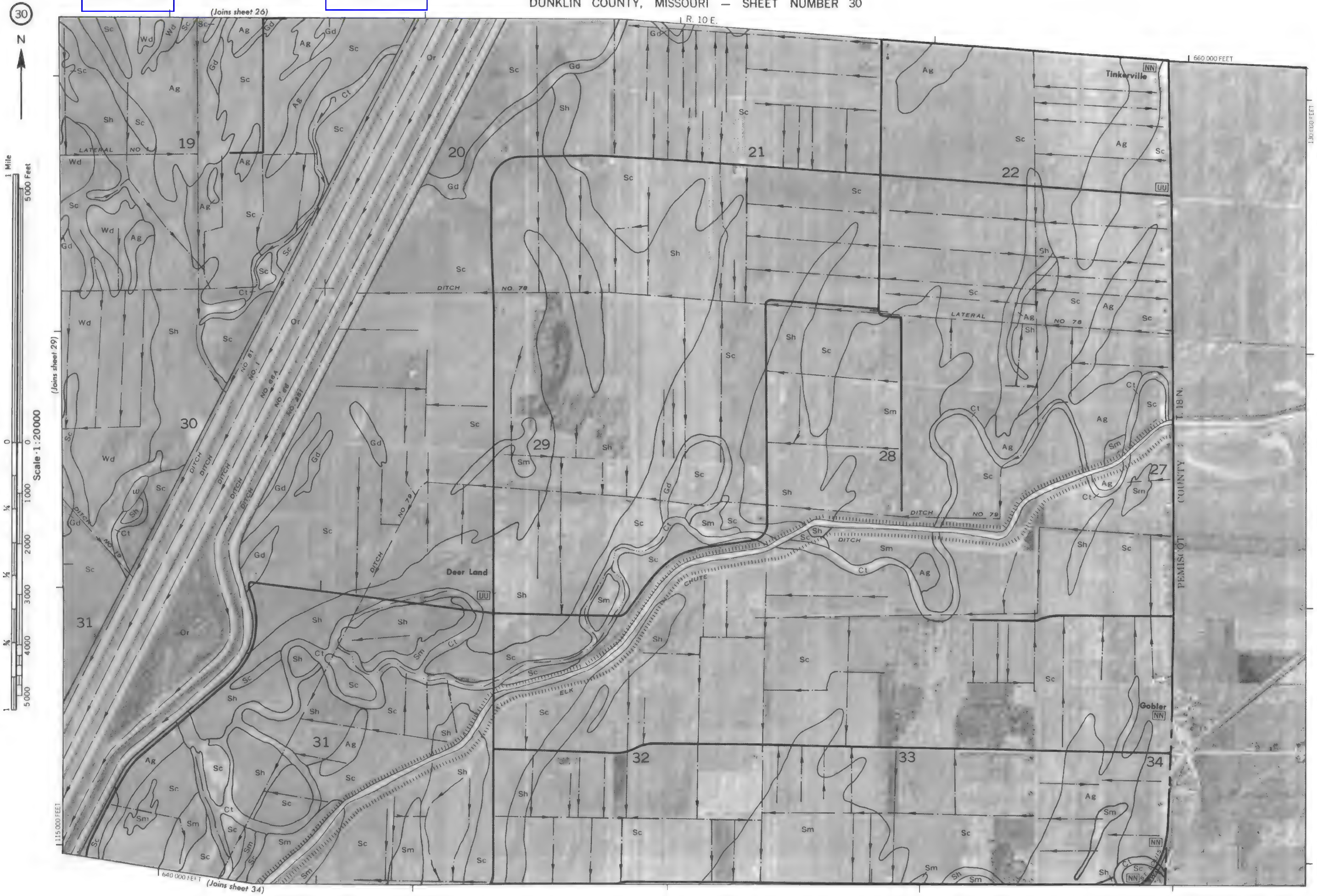

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DUNKLIN COUNTY, MISSOURI — SHEET NUMBER 31

Index Map Welcome Page Manuscript

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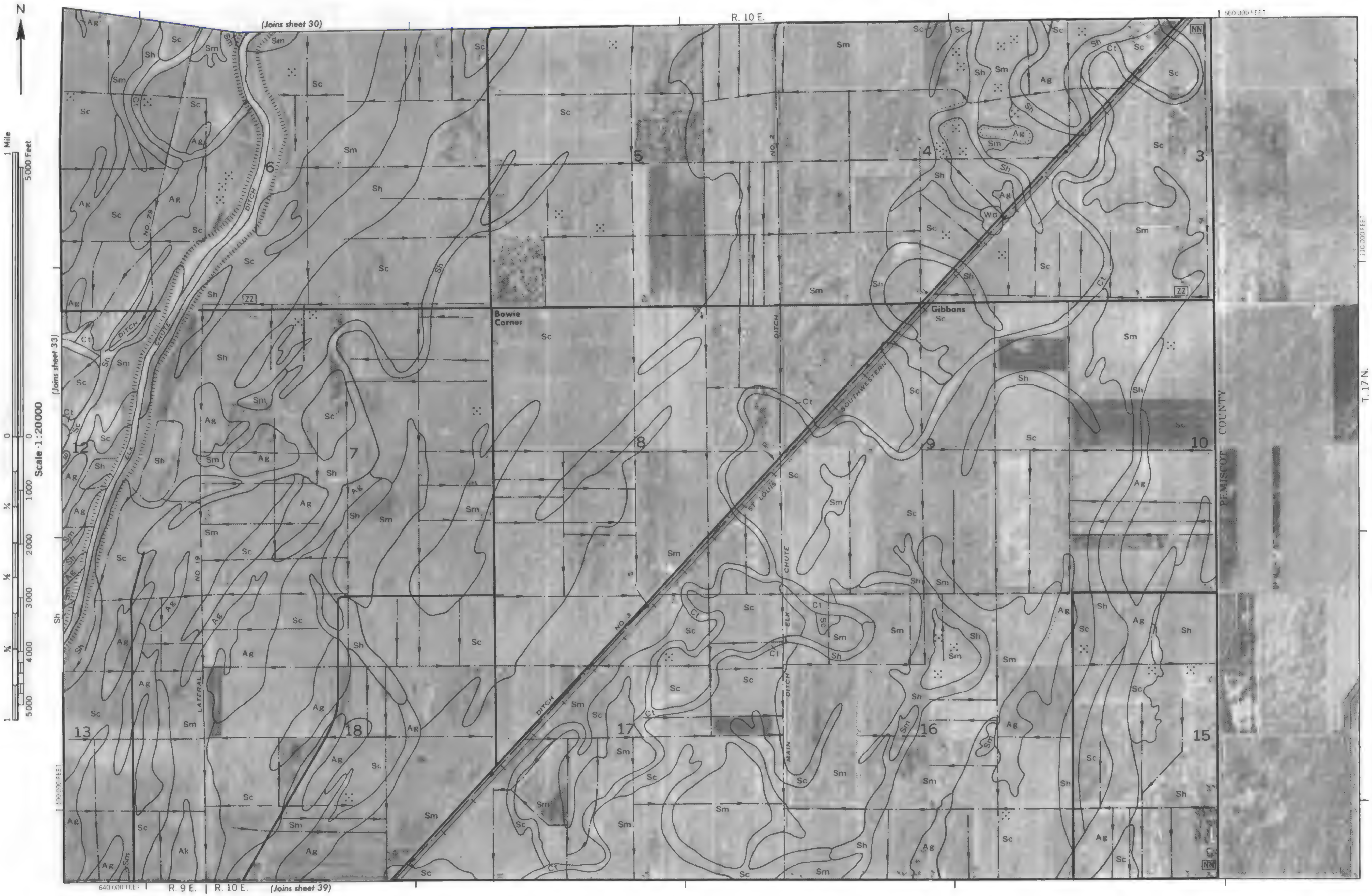
DUNKLIN COUNTY, MISSOURI — SHEET NUMBER 33

34

DUNKLIN COUNTY, MISSOURI — SHEET NUMBER 34



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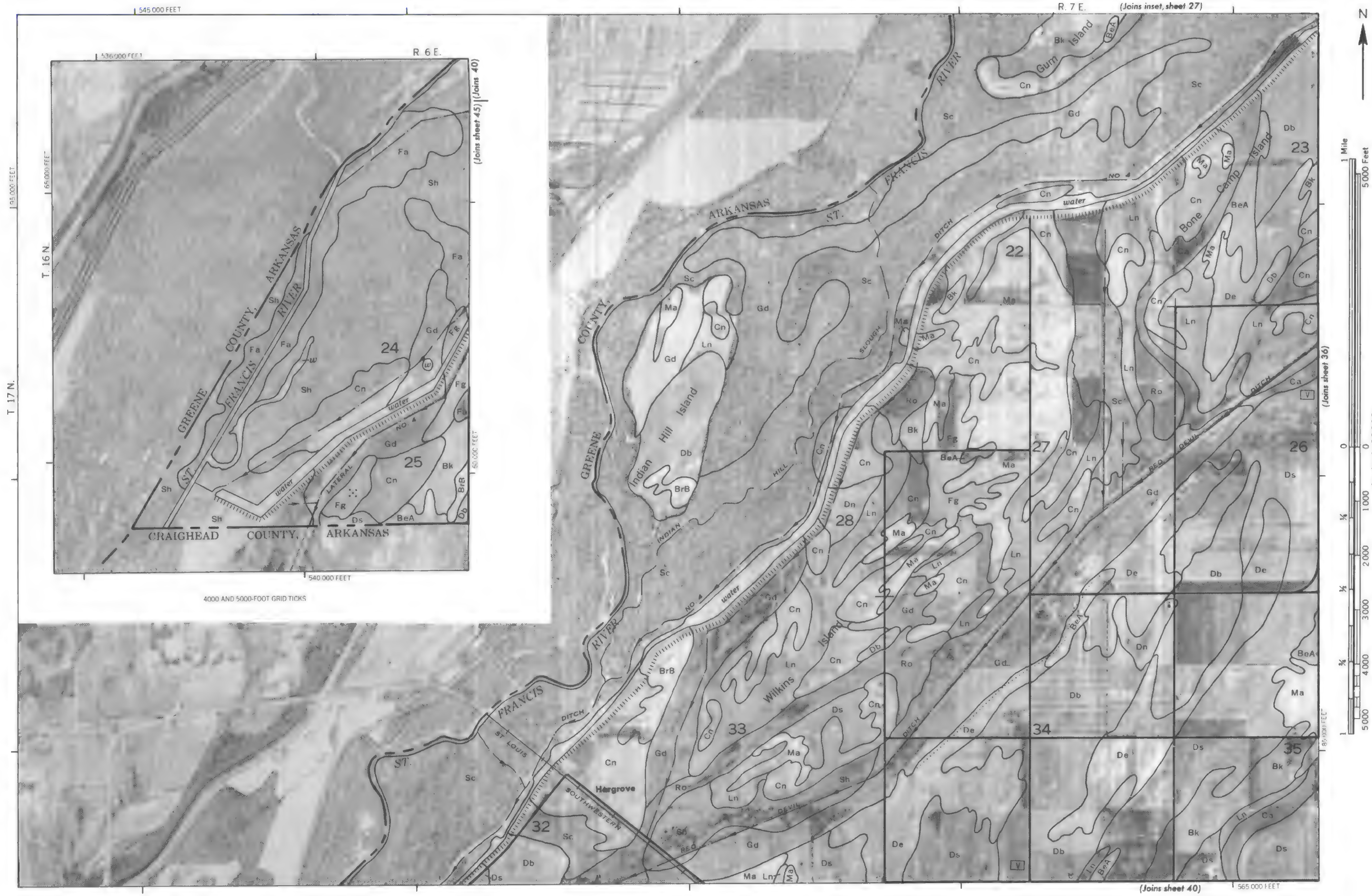
Index Map Welcome Page Manuscript



DUNKLIN COUNTY, MISSOURI — SHEET NUMBER 36

DUNKLIN COUNTY, MISSOURI — SHEET NUMBER 37

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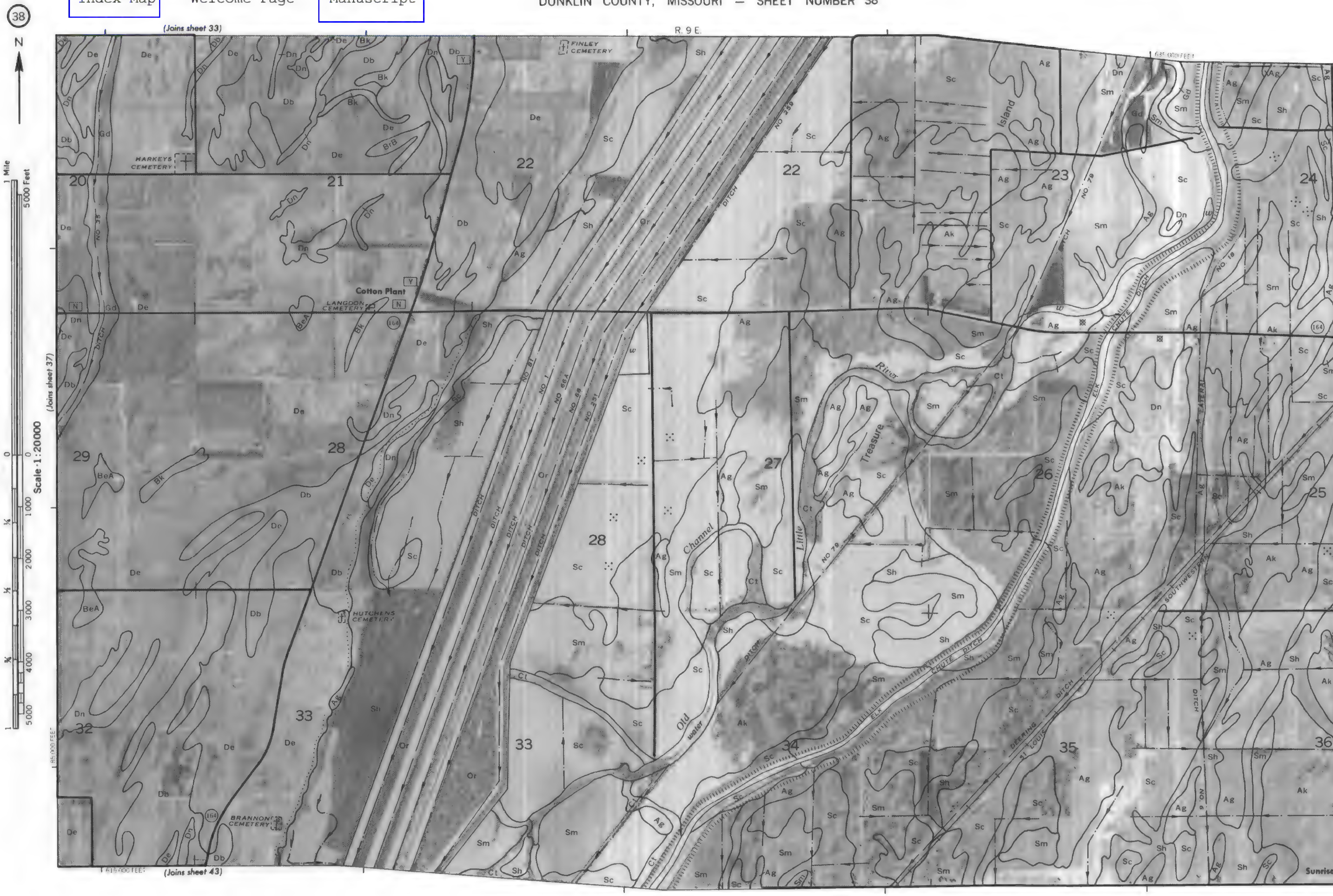

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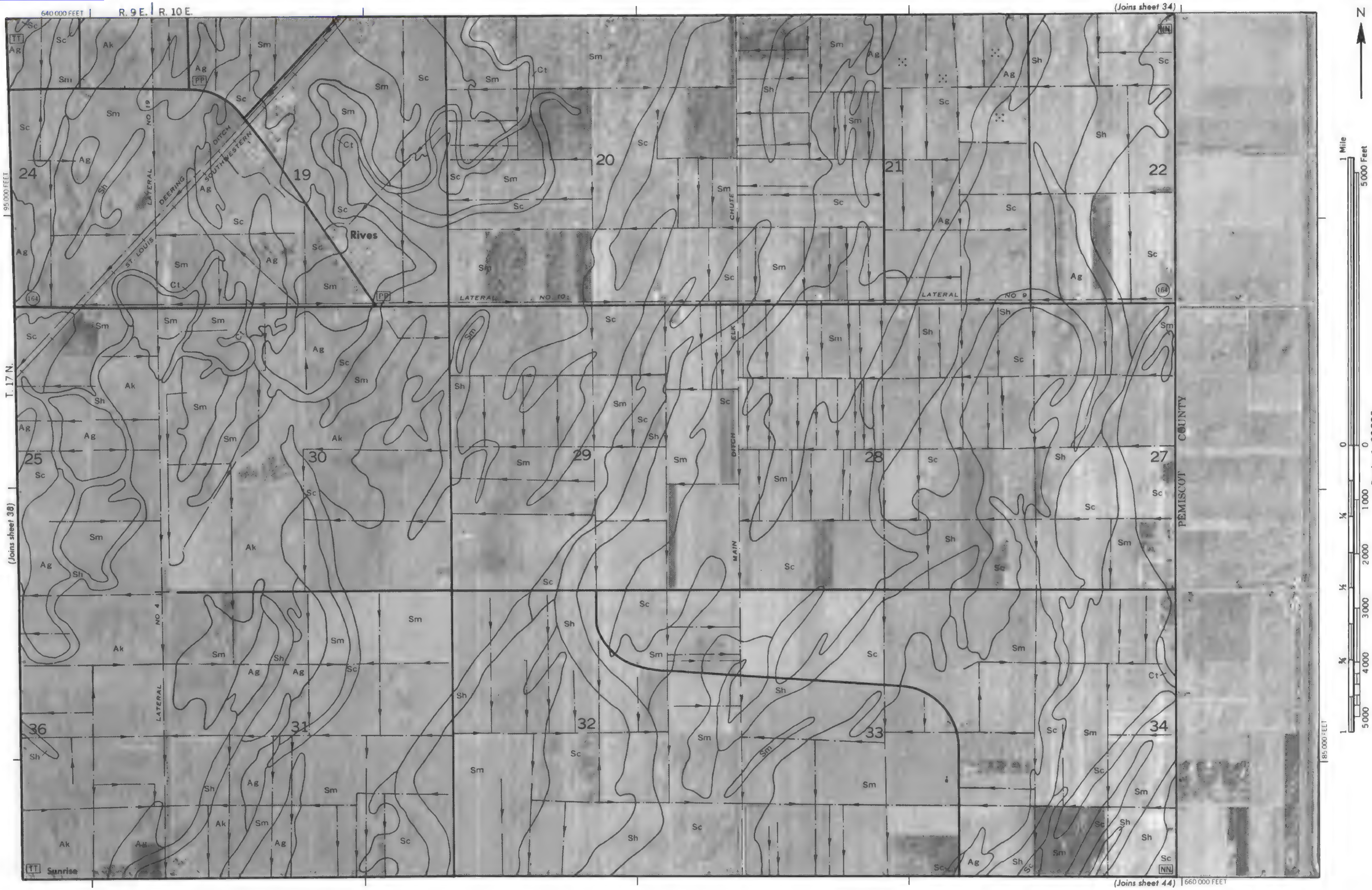

40

DUNKLIN COUNTY, MISSOURI — SHEET NUMBER 40

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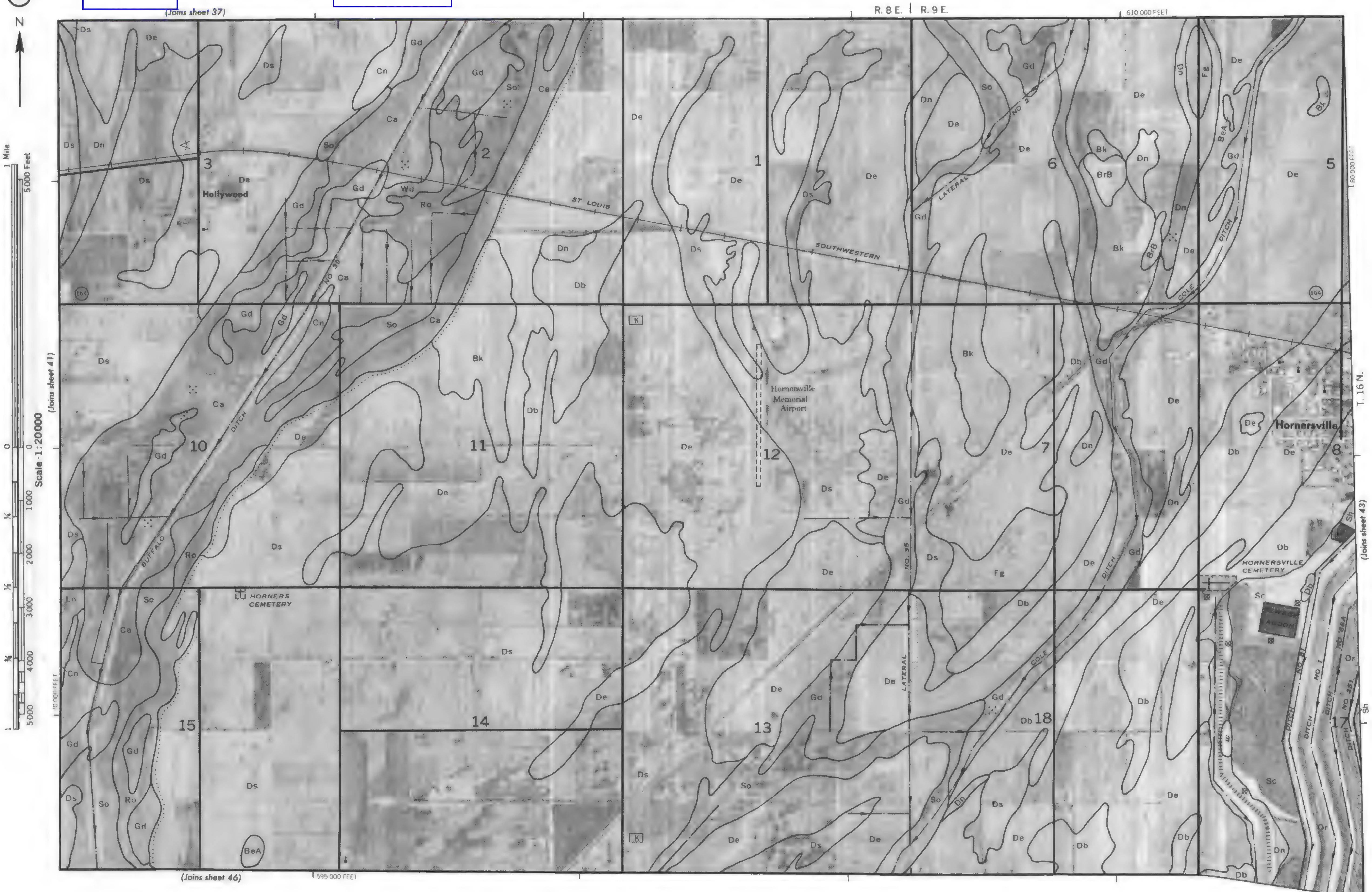
DUNKLIN COUNTY, MISSOURI — SHEET NUMBER 41

Index Map
Welcome Page
Manuscript

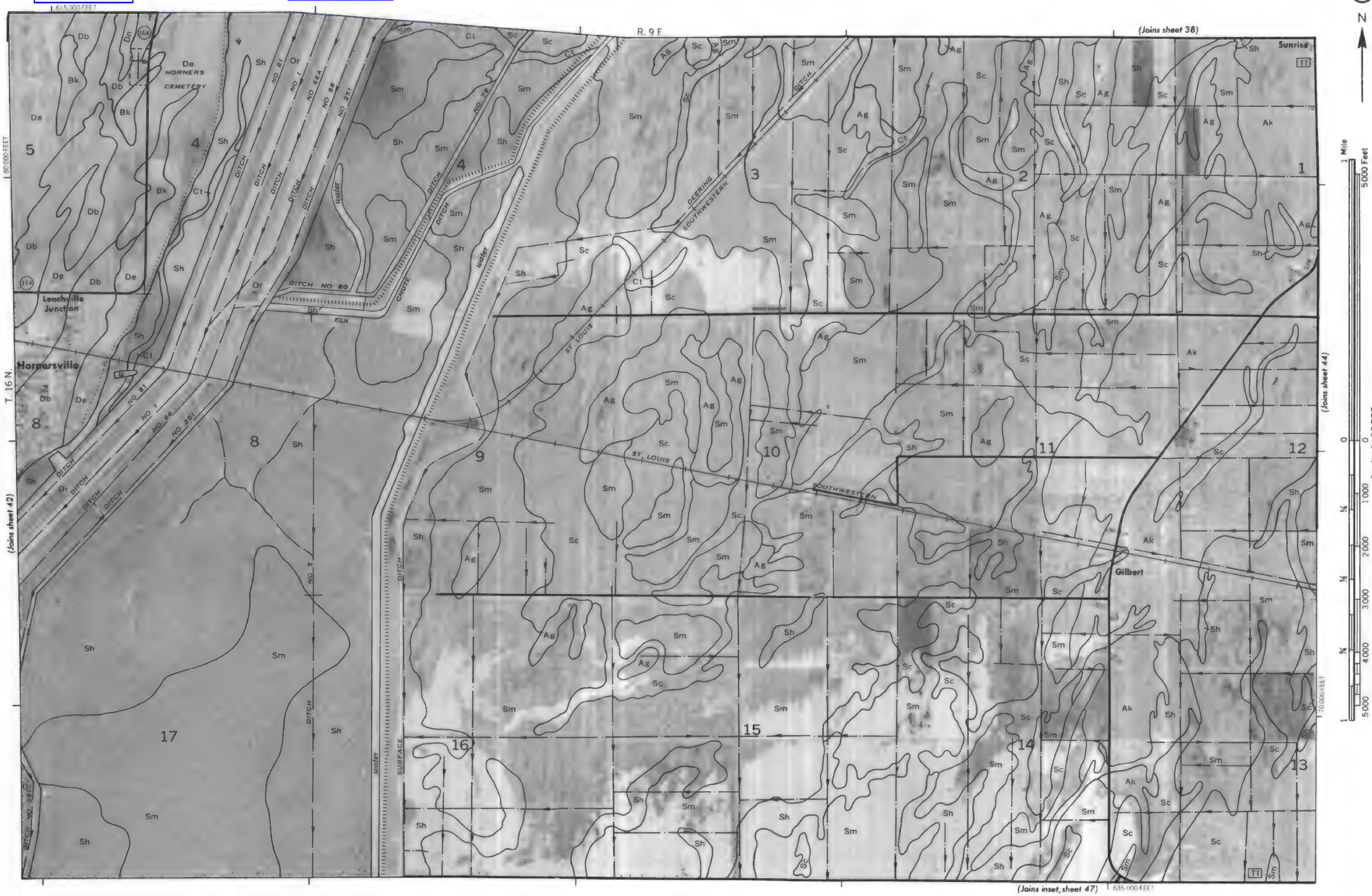
DUNKLIN COUNTY, MISSOURI — SHEET NUMBER 42



This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

Index Map Welcome Page Manuscript

DUNKLIN COUNTY, MISSOURI — SHEET NUMBER 43



DUNKLIN COUNTY, MISSOURI — SHEET NUMBER 44

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DUNKLIN COUNTY, MISSOURI — SHEET NUMBER 45

This map is compiled on 1973 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

DUNKLIN COUNTY, MISSOURI — SHEET NUMBER 47